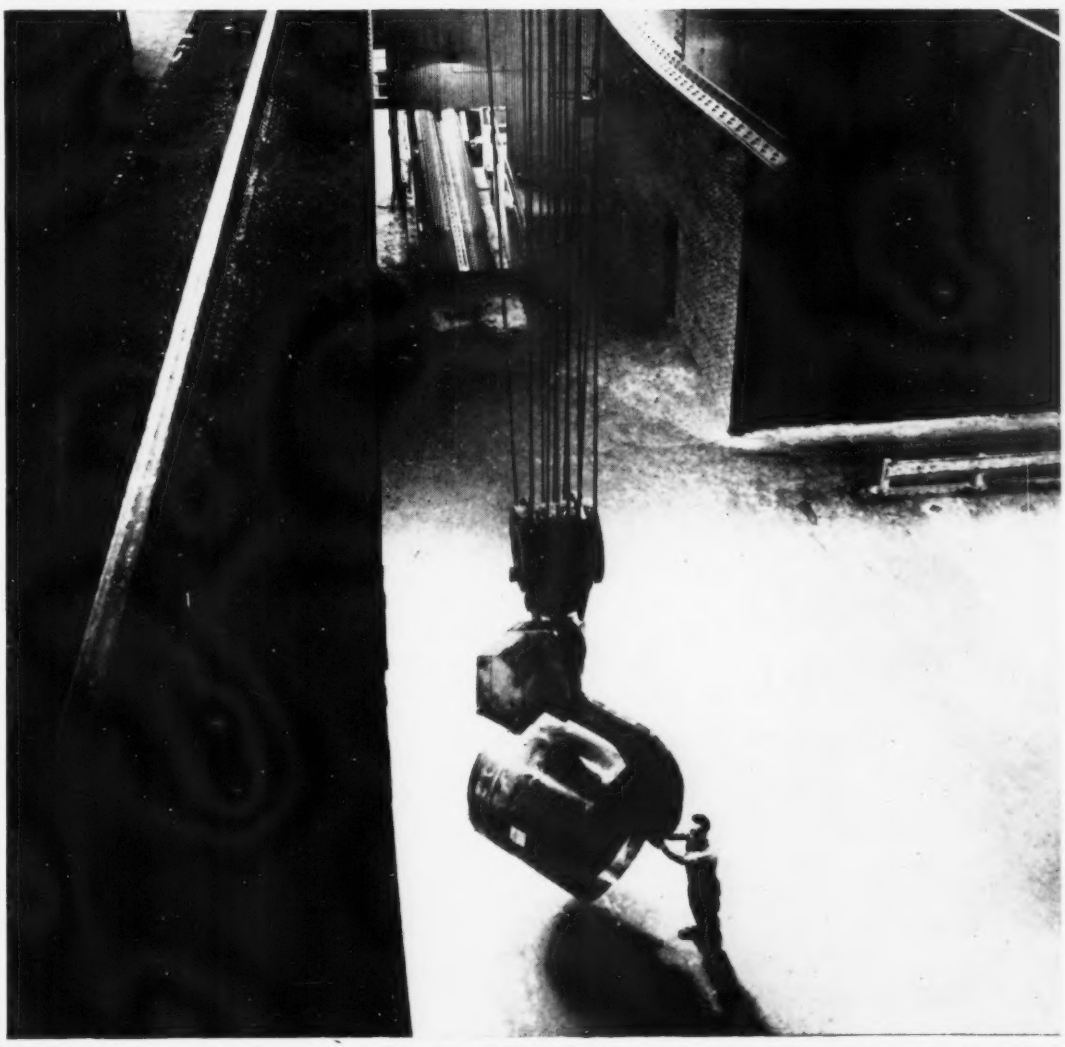
Occupational HAZARDS

THERE'S PROFIT IN PREVENTION

FEBRUARY
1949

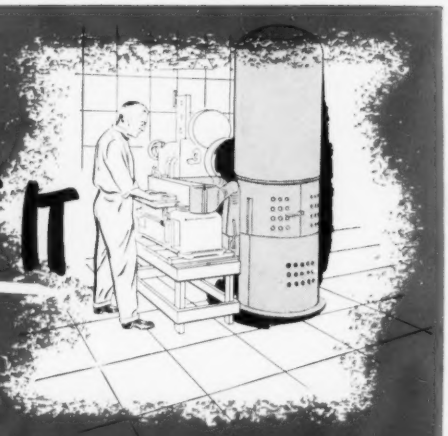


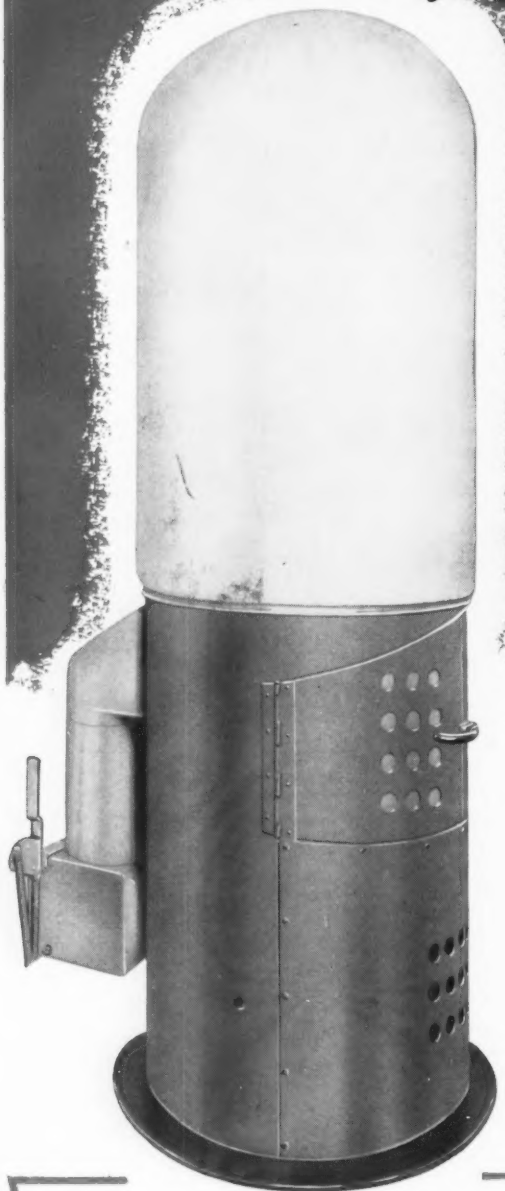
ROUTE TO
YOUR PLANT
E PROTECTION
EN: ARTICLES
ON FIRE
PROTECTION
OR INDUSTRY

IN THIS ISSUE:

. . . MATERIAL HANDLING . . .
SAFETY IN SANDBLASTING
. . . FIRE PREVENTION . . .

...PUT IT WHERE YOU WANT IT





The KIRK and BLUM *Self Contained* Dust Control Unit

● The new KIRK & BLUM Self-Contained dust control unit can be set up anywhere to serve a machine for any period of time.

These new units eliminate the need for long, costly pipe runs to remote areas of the plant where one or a few machines are located. These units collect shavings from one to four machines.

The KIRK & BLUM Self-Contained unit is entirely different and more efficient than smaller conventional units . . . not a cheap fractional H.P. product designed to a price.

This unit will do a fine job of dust collecting, handling of dust and shavings of wood working machines; grinding, buffing and polishing from metal working machines and similar dust sources.

Made by KIRK & BLUM, experts in dust control for over 40 years, your guarantee of complete satisfaction. Write for new booklet on this Self-Contained portable dust control unit. The Kirk & Blum Mfg. Co., 2802 Spring Grove Ave., Cincinnati 25, O.

Powered by a 3 HP motor. Has an air volume of 900 CFM at 2" suction with capacity for four 3", two 4" or one 6" pipe connection.

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FOR CLEAN AIR . . . THE [redacted] TOOL

KIRK AND BLUM

DUST CONTROL SYSTEMS

PRODUCTIVE HANDS!

Keeping the hands of experienced workers nimble and work-sensitive with the aid of a good granulated skin cleanser increases output, reduces off-the-job time losses, guards against expensive dermatitis compensation claims and assists in the maintenance of quality standard. The result is like adding many hours of productive effort to each worker without overtime. You need not guess about which granulated skin cleanser to specify — PAX-LANO-SAV* HEAVY DUTY is the *only* skin cleanser containing PAX-LANO-SAV EMOLLIENT which combines generous quantities of lanolin plus other fine skin normalizers. PAX-LANO-SAV HEAVY DUTY helps to prevent skin dryness, chapping, stiffness and also irritations which may be caused by industrial contact irritants. No other occupational skin cleanser can surpass PAX-LANO-SAV HEAVY DUTY in gentle cleansing thoroughness, suds-ability, safety and excellence of quality. It is accepted for advertising in publications of the American Medical Association.

For a brisk-feeling washcloth action specify Pax-Lano-Sav Heavy Duty "REGULAR GRANULATION". For a soft smooth-feeling wash that will also give thorough cleansing action specify "FINE GRANULATION".

When you specify any Pax Product you get as an extra dividend the experience and ability of Pax Technicians acquired through 22 years of continuous research and development

PAX-LANO-SAV HEAVY DUTY GRANULATED SKIN CLEANSER

There is Nothing Finer For All General Occupational Skin Cleansing

PAX-LANO-SAV*— a superior skin emollient combining lanolin and other special skin normalizers.

49-B

ADVERTISED IN AMERICAN MEDICAL ASSOCIATION PUBLICATIONS

G. H. PACKWOOD MANUFACTURING CO. • 1545-55 TOWER GROVE AVE. • ST. LOUIS 10, MO.

Manufacturers of Fine Industrial Skin Cleansers

® Trademark Reg. U. S. Pat. Off.

*Tradename of G. H. Packwood Mfg. Co.

If you do not require a skin cleanser containing an emollient then order either PAX HYSPEED (Duramen-Meal* Scrubber) or PAX CORN-TEX (Corn-Meal Scrubber) or PAX MECHANICS (Combination Scrubber) which are national but inexpensive leaders among all granulated hand soaps made without an emollient.

With Water Tank and Vacuum for Rug Scrubbing

With Dispenser for Hot Waxing

★

Interchangeable Brushes, Pads, Sanding Disc

Wire Brushes

Fibre Brushes

Polishing Pad

Steel-Wool Pad

Sanding Disc

THE *Multiple-Purpose*
FLOOR-MAINTENANCE MACHINE THAT'S
Two Sizes in One!

Here is a floor-maintenance machine that not only can be used for many types of floor care, but also affords the further economy of a machine that is two sizes in one. This *100 Series Finnell*, in one of the larger sizes as shown above at left, can be reduced to the small size unit shown in circle.

Note the low, trailer-type construction of the machine, and how easily it goes beneath furnishings. Thus it is ideal for use in crowded areas. In fact, the dual size feature and low construction of the machine adapt it to use on many floors otherwise inaccessible to machine care.

As easy to handle as a household vacuum cleaner, yet this *Finnell* is powerful . . . fast . . . and thorough. Mounts a G. E. Drip-Proof Capacitor Motor . . . is equipped with Timken Bearings. And the ruggedly constructed worm drive, housed in an extra-capacity leak-proof gear case, lubricated for 1500 hours, assures smooth, noiseless performance. A precision product throughout. Three sizes: 13, 15, and 18-inch brush diameter.

For consultation, demonstration, or literature, phone or write nearest *Finnell* branch or Finnell System, Inc., 3502 East Street, Elkhart, Indiana. Branch Offices in all principal cities of the United States and Canada.

Everything FINNELL for Floor Care

FINNELL SYSTEM, INC.

Pioneers and Specialists in

FLOOR-MAINTENANCE EQUIPMENT AND SUPPLIES

BRANCHES IN ALL PRINCIPAL CITIES

Occupational HAZARDS

VOLUME 11 • No. 4

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"THERE'S PROFIT IN PREVENTION"

COVER: A 100-hp Westinghouse mill-type motor drives the main hoist of this 40-ton crane as it moves three tons of coiled steel about the plant. For material handling safety codes see article appearing in this issue. *(Westinghouse Photo)*

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Here's One Expense Cost-Conscious Management has cut—to Rock Bottom in these Days of Rising Costs

Year after year, industrial eye accidents embezzle your profits and cut your production by sidelining able men, putting machines in the hands of less experienced workers, lowering morale, hiking claims and insurance costs. All this on top of the cost of medical service!

Aware that 98% of industrial eye accidents are preventable, many companies have solved this problem by installing an adequate eye protection program with results like this: cost of eye accidents in year prior to program, $4,262.00; cost of eye accidents in first year of program, $204.59! Ask your AO Safety Representative how an AO Eye Protection Program can cut your costs.

American Optical

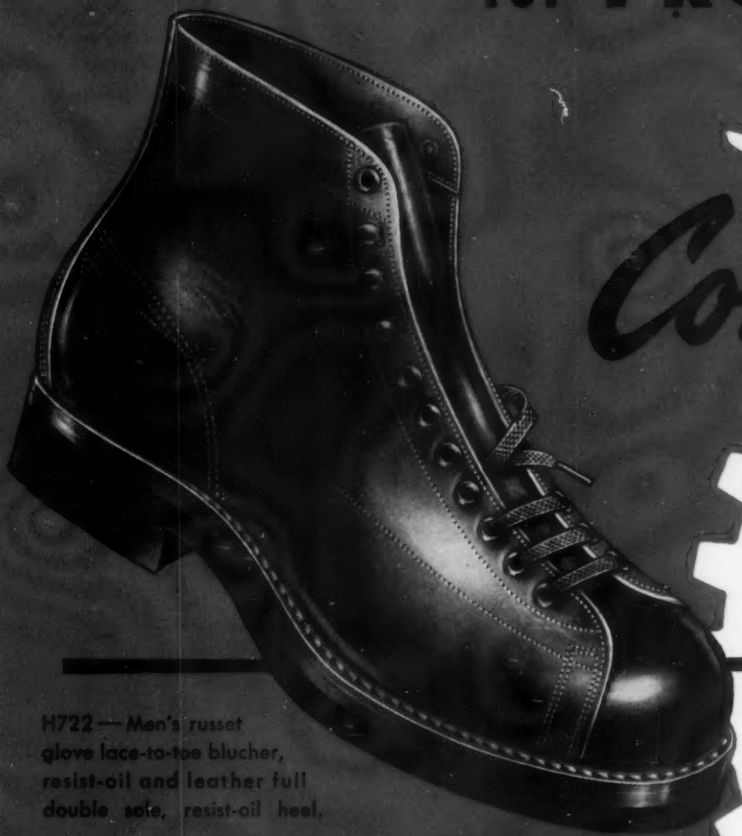
Safety Division

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

You can't beat

HY-TEST ANCHOR FLANGE Safety Shoes for PROTECTION

plus Comfort



H722 — Men's russet glove lace-to-toe blucher, resist-oil and leather full double sole, resist-oil heel.

Yes sir, there is such a thing as a *comfortable* safety shoe . . . it's Hy-Test. All Hy-Test safety shoes are built for action . . . built to give the comfort that active jobs require. And you can bet the protection is there in every pair, thanks to Hy-Test's Anchor Flange steel box toe.

WRITE FOR FREE CATALOG

. . . Insure Worker's Feet in Sure Protection

with HY-TEST ANCHOR FLANGE Safety Shoes

THE WORLD'S LARGEST SELLING SAFETY SHOE

HY-TEST DIV: INTERNATIONAL SHOE CO. • ST. LOUIS 3, MO. • EASTERN OFFICE • MANCHESTER, N. H.

HY-TEST SAFETY SHOES

PROVED AND APPROVED

New CESCO CUP-TYPE GOGGLES

CESCO Chippers Goggles • Number 545-C, with brown thermoplastic cups, shown above. Well ventilated and equipped with 50 mm Super-Safety Lenses.

FEATURING... *The COMFORT-KING Headband—holds goggles firmly with 30% less tension. Made of round molded rubber—will not kink, curl or twist. No buckles or sharp edges. Instant adjustment to any head size.*

CESCO Chippers Goggles • Number 545-T, with transparent cups. Well ventilated, equipped with 50 mm Super-Safety Lenses.

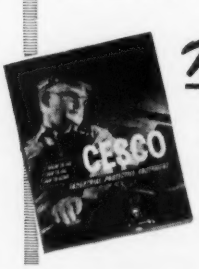
CESCO Welders Goggles • Number 545-W, with 50 mm Cescoweld and cover lenses.

Job-Tested and Worker-Endorsed where constant use is required

• CESCO's new development in cup-type goggles increases wearer comfort and assures greater worker safety. These CESCO goggles have the "feel" of lightweight goggles, yet give all the protection good cup-type goggles must provide.

CESCO goggle cups are engineered to fit both left and right eye areas snugly, yet gently. Broad contact surfaces and correct balance eliminate pressure spots. COMFORT-KING Headbands provide the right firmness to hold the goggles comfortably in correct position.

If your workers are not yet wearing the new CESCO Cup-Type Goggles, order them now. Use will prove their advantages to you.



New CESCO CATALOG

Tells you where to use, how to use, and how to select industrial protective equipment. Be sure to have this safety guide. Write for your copy.

CHICAGO EYE SHIELD CO. • 2308 Warren Boulevard • Chicago 12, Illinois

CESCO FOR SAFETY

OFFICES IN: Boston, Buffalo, Cincinnati, Cleveland, Columbus, Dallas, Detroit, East Orange, Houston, Los Angeles, Montreal, Philadelphia, Pittsburgh, Seattle, St. Louis, St. Paul, Toledo, Tulsa

ONLY Thom McAn gives you:

★ Bed-Rock Prices!

★ Top Foot Safety!

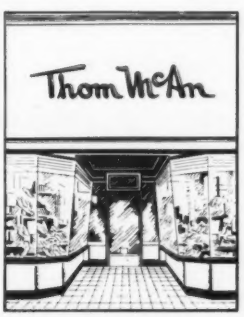
★ 4-way Plant Service!

SF-687 – Moccasin toe blucher, cordovan color, oiled leather sole, rubber heel.

1 All styles are maintained in our stock at *all* times, assuring prompt delivery on any style, any size!

2 You carry fewer shoes in stock, tie up less money, save on stock space.

3 A guaranteed exchange of unnecessary sizes and styles for *needed* sizes and styles prevents dead stock and inventory losses.



4 Thom McAn operates more than 530 stores in over 300 cities. This unequalled experience in merchandising and customer satisfaction is available to all plant shoe departments at all times.

COMPARE THE PRICE!

Thom McAn Safety Shoes are made by the manufacturer of the world's largest selling shoe! Famous coast-to-coast for top quality at lowest prices! And you get low-priced Thom McAn Safety Shoes *at no sacrifice in safety standards!*

COMPARE THE SAFETY!

In plant after plant, the records show, Thom McAn's contribute to better safety records, cut down foot accidents. For workers buy and *wear* Thom McAn's *willingly!* It's the brand they KNOW, the brand they trust, the safety shoe that *feels good* on their feet!

Sold Direct to Plants

$7.15 net F.O.B. Worcester, Mass. Purchases up to 48 pairs — straight list price. 5% discount on orders of 48 to 144 pairs. 10% discount on orders of 144 pairs and over. Prices subject to change without notice.

Also Sold Through Thom McAn Stores

Write for complete details of Thom McAn Store Service Plan.

Address Orders and Inquiries to:

THOM McAN SAFETY SHOE DIVISION, 25 West 43rd Street, New York, N. Y.

MORE MEN WEAR THOM McAN SHOES THAN ANY OTHER SHOE BRAND

Power Presses Can Be Safe!
MICROTRIP won't let them operate until hands are out of danger!

MICRO... first name in precision switches
Both hands must touch the MICROTRIP switches at the same time.
MICROTRIP control box and switches are easily installed. Accidental or deliberate operation of only one switch opens circuit, makes it inoperative.
MICROTRIP

● Safety engineers are finding MICROTRIP the ideal safety device for those hard-to-guard power presses where materials must be fed by hand.

MICROTRIP requires use of both hands to operate and cannot be "cheated". Unless both switches are touched at the same time the MICROTRIP control circuit becomes inoperative. It remains so until a button on the side of the control box is manually reset.

MICROTRIP is easily and quickly installed as the electrical control on present punch presses, spot welding and riveting machines, air presses and other power-operated equipment.

Operators appreciate its light touch actuation . . . as low as 10 ounces . . . which allows steady, fast press work with less fatigue.

MICROTRIP is a new safety device by MICRO SWITCH, whose precision switches are used throughout industry. Write MICRO SWITCH today for full information.

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A DIVISION OF FIRST INDUSTRIAL CORPORATION
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Chicago • New York • Boston
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Sales Representatives:
Portland • St. Louis • Dallas • Toronto

Do you have any questions, theories or ideas concerning industrial health or safety? If you want to give them a good airing—send 'em along. We'll publish all space permits.

New Products

OCCUPATIONAL HAZARDS:

We receive your magazine with the compliments of Industrial Products Company, Philadelphia, Pa.

Please send us more detailed information on the following new products listed on page 28 of the November issue: NP-1 Safety Floor Mats, NP-4 Fluorescent Lamp Safety Device, and NP-5 Oil Absorbent.

We use your illustrated feature article "And Sudden Injury" on one of our bulletin boards and wish it could be removed from the magazine for posting without destroying the text of other articles.

You are to be complimented on the material provided in the "Technical File on Toxic Gases and Vapors".—Fordyce Coburn, Exec Vice President, the E. & G. Brook Iron Company, Birdsboro, Pa.

TECH File—Gases and Vapors

OCCUPATIONAL HAZARDS:

Recently in looking through your magazine, "Occupational Hazards", we came across a statement described as a technical file of toxic gases and vapors No. D-29 in which a paragraph D-33 describes hydrogen cyanide.

There was a statement in this paragraph under D-35 that "The gas may be produced accidentally in poisonous quantities by the burning of celluloid and nitrocellulose, as in X-ray and photographic film".

To the best of our knowledge there are no x-ray films made with a nitrocellulose base, nor have such films been made for many years, and I believe that I am also correct in stating that hydrogen cyanide material is not given off in the de-

composition or burning of the various types of safety film.

Commercial photographic film, with few exceptions, is also on a safety base which does not give off this material on burning.

Nitrocellulose motion picture film does give off dangerous gases on burning, these gases consisting principally of carbon monoxide and various nitrous oxides.

The nature of these gases has been long known, and I am enclosing a copy of the pamphlet on Pyroxylin Plastic published in 1931 by the Inspection Department of the Associated Factory Mutual Fire Insurance Company.

We have noted a similar statement in the book "1021 Answers to Industrial Health and Safety Problems". This statement appears on page 106 and like the statement in the magazine does not quote any supporting authority.

Incidentally, while we cannot state any date when the change over will be complete, an appreciable percentage of motion picture film is now on safety base and the amount is increasing regularly so that in a matter of a relatively short time both the fire hazard of nitrocellulose film and the toxic hazard of the fumes given off by decomposition will be eliminated except for archival storage.

We believe that a correction of this data sheet would be in order so that everyone may be aware of the character of the fumes given off by nitrocellulose decomposition so that the correct treatment may be applied if necessary. It is also desirable to eliminate reference to types of film which do not give off dangerous fumes, or better, to indicate that x-ray film, and safety base film do not give off dangerous gases.—Allen L. Cobb, Acting Safety Director, Eastman Kodak Company, Rochester, N. Y.

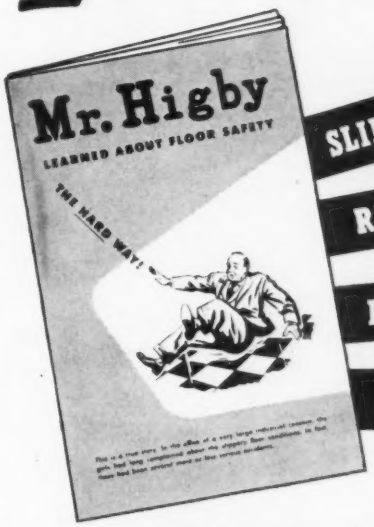
Thanks to Reader Cobb for this information.—Ed.

Dust Exposures

OCCUPATIONAL HAZARDS:

We should like to have your permission to make a reprint of the article titled, "Controlling Abnormal Dust Exposures," which was written by M. W. Thompson of the United States Potters Association, and appeared in your February, 1948 issue. This reprint would appear in the newsletter of the newly formed Glass and Ceramics Section of the National Safety Council.—John P. Stephenson, Director of Safety and Health, Ball Brothers Co.

Learn how to lick these problems!



SLIP AND FALL ACCIDENTS

RISING INSURANCE RATES

HIGH HOUSEKEEPING COSTS

DETERIORATING FLOORS

This new booklet reveals CAUSE and CURE

Here's 10 minutes of eye-opening reading . . . the actual story of a company president (we call him Mr. Higby) who flopped on the highly polished floors in his office, and wanted to know why.

This fast-moving booklet follows Mr. Higby as he probes into the little-known subject of floor care. He asks (and you learn the answers to) questions you've probably wondered about yourself:

- **why your floors need waxing so often**
- **why they get slippery**
- **how much floor-care *really* costs**

You'll find the explanations revealing . . . in some cases, startling. You'll also learn how the Legge System's *personal engineering* plan helps you maintain your floors scientifically with Non-Slip safety . . . and saves you money in the bargain!

How to make floor dollars work harder

Many executives learned how to slice overhead costs from an earlier version of *Mr. Higby Learned About Floor Safety the Hard Way*. This up-to-date edition is even more informative . . . a complete executive handbook on the safe-and-sound care of floors. Now . . . before you spend another unnecessary floor dollar . . . send the coupon for your free, no-obligation copy. Walter G. Legge Company Inc., New York 17, N. Y. Branch offices in principal cities.

JUST CLIP THIS COUPON TO YOUR LETTERHEAD AND MAIL

LEGGE SYSTEM *of Non-Slip Floor Maintenance*

Walter G. Legge Co. Inc.
101 Park Ave., New York 17, N. Y.
Please send me a free, no-obligation copy of your *Mr. Higby* book.

Signed_____
Title_____
Type of floor_____
Area_____sq. ft.

O-A4

2 NEW WILLSON* MONO *Goggles*

Some like 'em CURVED

Some like 'em FLAT

Newly styled plastic eye protection with choice of curved or flat lenses offer new features designed to add to their already predominant popularity. The WILLSON MONO-GOGGLE, just over an ounce in weight, is the answer to getting safety equipment worn on many hazardous jobs.

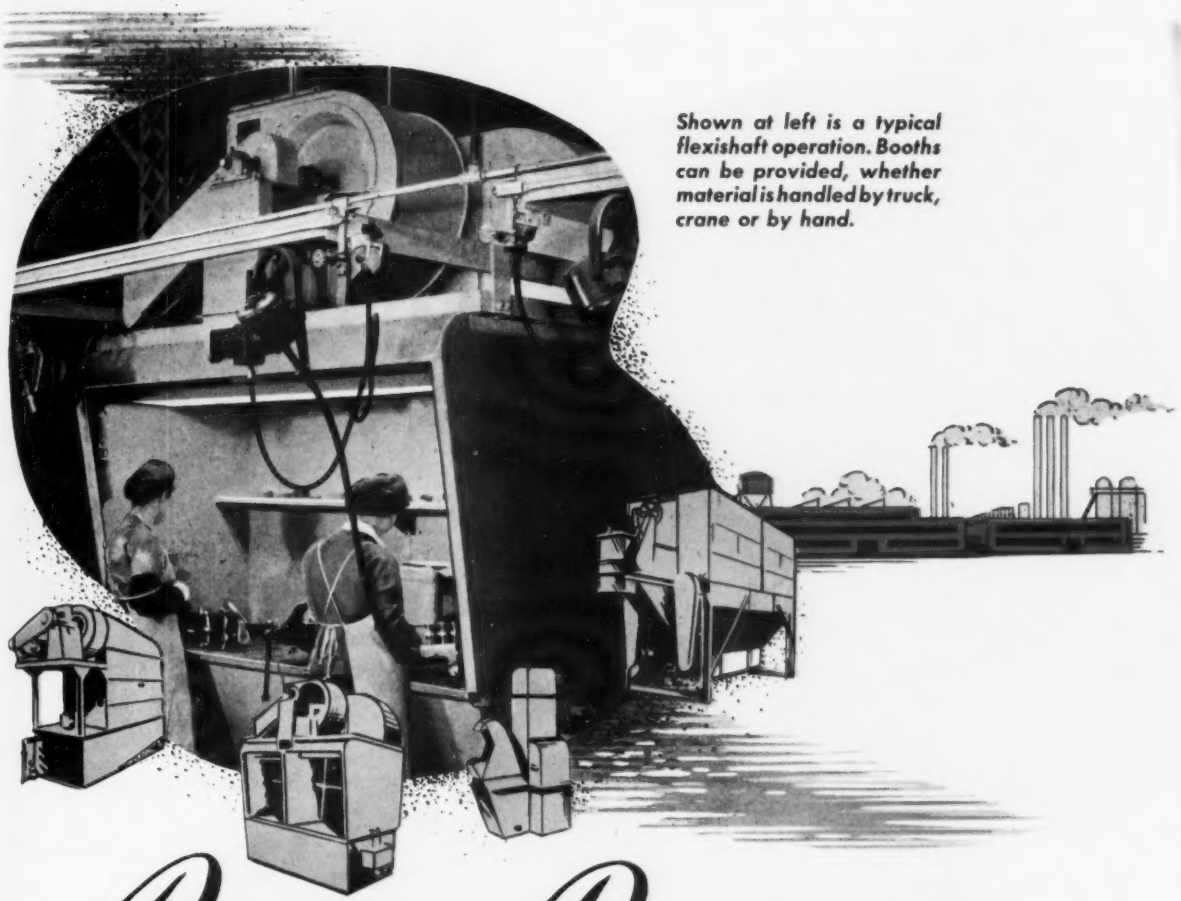
- The new flat lens design retains all the safety features of the curved lens.
- Both provide ample room for wearing of prescription glasses in comfort. The flat style, however, provides additional clearance for molded spectacle frames.
- New drop-eye shape gives wider vision.
- Greater ventilation area provides better air circulation and more wearer comfort.
- Both new designs available in clear acetate frames or the new flexible, mottled-brown, polythene frame.

WILLSON*

For complete information on these products and their application, as well as other eye and respiratory protective devices, get in touch with your Willson distributor or write us direct.

*T. M. Reg. U. S. Pat. Off.

WILLSON PRODUCTS, INC., 209 WASHINGTON STREET, READING, PA.



Shown at left is a typical flexishaft operation. Booths can be provided, whether material is handled by truck, crane or by hand.

Better Protection

from HARMFUL DUSTS *and* FUMES!

As a PIONEER in the development and improvement of standard methods of *safely* collecting DUST and harmful FUMES, Peters-Dalton is *fully equipped* to handle whatever problem, small or great, you may confront.

Our trained sales engineers, working with our complete engineering staff, stand ready to submit layouts, operational costs and equipment estimates.

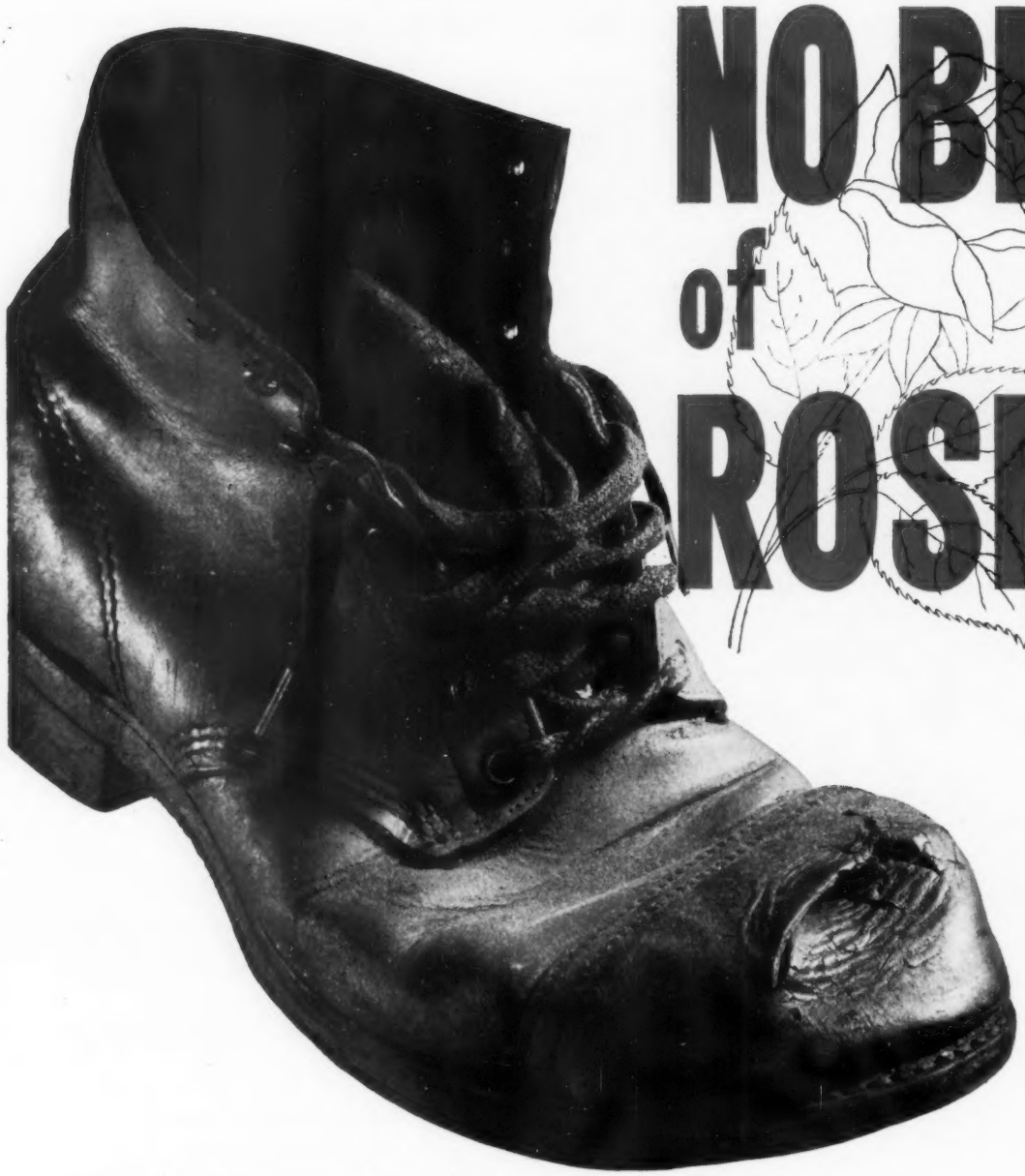
see our CATALOG in SWEET'S FILE MECHANICAL INDUSTRIES

COMPLETE FINISHING SYSTEMS

PETERS-DALTON Inc.

17904 RYAN ROAD • DETROIT 12, MICHIGAN

NO BED of ROSES



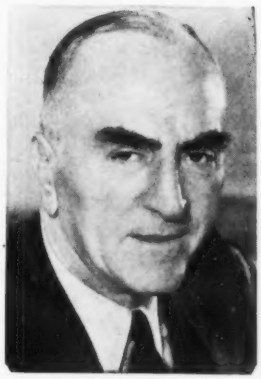
A LIFT CHAIN SLIPPED. 600 pounds of steel bedplate crashed down on this Lehigh safety shoe like a power-driven sledge. The 1800-pound impact actually imbedded a corner of the bedplate in the Lockrim* steel toe box. The workman in this Lehigh had only two bruised toes! Four days layoff. No great news. Safety shoes are supposed to save toes. But no safety shoe was ever built to take punishment like this. Lehighs do and deliver. Feet and toes come high. Lehighs don't. Phone or write us today and we will have a representative call.

FREE Pay envelope enclosure with ten similar case histories will convince any skeptic that safety shoes pay. No advertising. Send for copy or enough to cover your payroll.

*T. M. REG.

LEHIGH SAFETY SHOE COMPANY
ALLENTOWN, PA.
Division of the ENDICOTT JOHNSON CORPORATION

Goods For Goods



CAPITALISM is a steadily shrinking island of Free Enterprise surrounded by turbulent and destructive seas of Monopoly controlled by economic and political dictators.

These monopolies, in which neither producer nor consumer, employer nor employee, determine the scale, standard or cost of living, range all the way from the so-called Socialist system, now in control in England, to enslaving Communism, as practiced in Russia and other Iron Curtain countries.

The whole purpose of business, industry, finance and agriculture is to produce at costs that provide the greatest volume of goods for the greatest number of people.

Men can fill libraries with books on economics, monetary systems, poiltical sciences and social reforms. I will not say that this is a waste of time, but I do claim that all the codes which govern and concern the comfort of man can be compressed into these three words: **GOODS FOR GOODS!**

The sooner the world re-establishes this simple fact, the sooner we will return to an even keel of political, mental and economic security.

There is no wealth of any kind outside of products in services and goods. The only riches which enable us to eat and drink, or clothe, shelter and educate ourselves and our families are the riches that are made through the skills of man in industry or grown through the skills of man on farms.

No government can wave a magic wand and provide things for people who do not produce. No social code, no political vote-bait, no creed can meet the needs of those who do not produce. "GOODS FOR GOODS" is the controlling law. It cannot be amended nor repealed.

Production, not money, is the master of the world. And I, for one, have never been able to understand why a system such as America's unbeatable policy of productive and shared Free Enterprise needsso much explanation, so much underscoring, so much selling. Free Enterprise should sell itself every day in the world-wide news you read in newspapers, hear on the radio, or see on the news-screen.

Capitalism has become a highly misinterpreted word. Capitalism, in the true productive sense, is not a banker under a top-hat, a "boss" in a limousine, or a stockholder on a yacht. Capitalism is a structure of production, and I invite anyone to show where the state-ownership of Socialism or mass-enslavement of Communism have provided so much for so many in any land on earth as has Capitalism in America.

We in America are free to work where we want to work; free to work at the type of work we want; free to live where we want to live. Try to do that in Russia, and **YOU LAND IN JAIL.**

It would be wonderful if we were taught in school that Time is worth more than money—not that hours are only dollars, and that minutes are only cents.

If that were the case, I firmly believe we would be less wasteful with our most productive possession—TIME! Time to produce—Time to rest and play—Time to improve ourselves—and Time to establish on earth the Realm of Brotherhood that God created.

Eastern Air Lines, Inc.

President and General Manager,
Eastern Air Lines, Inc.

SAFETY CODES FOR MATERIAL HANDLING EQUIPMENT

by
ERLE M. HAYS
Crane and Bridge Department
Dravo Corporation
Pittsburgh, Pennsylvania

As the production cost of most products is directly proportional to the cost of handling material used in the process, industries today are making constant strides in the improvement of their material handling operations. Operation costs have almost always been reduced by the substitution of mechanical for manual methods. *The expanding use of mechanical equipment for handling materials has created a challenge to both builders and users to determine if safety codes now adopted cover in their scope all the many types of material handling equipment and if improvements in the existing code requirements are needed.*

Materials handling equipment may be classified under the following general types:

(1) Cranes, (2) Conveyors, (3) Trucks, (4) Lifts and Hoists, (5) Tractors and Trailers, and (6) Mono-rail Systems.

It is the purpose of this article to discuss existing electrical codes which apply to heavy material handling equipment such as cranes, whirlers, and bridges and to present other safety regulations which may be desired by the Industry as additions to the present codes. The need of establishing standard recommended practices to follow in the design of safe material handling equipment, which would be used in conjunction with existing safety codes, will also be discussed.

The American Standards Association Safety Code B-30.2 for Cranes, Derricks and Hoists, which was adopted and published by the Association in 1943, has given to the Industry a most valuable coordinated set of definitions and rules to use as a guide in the design of safe equipment. The committee which developed the code has done a monumental job. Its effects have already been measured by the Industry. It is recognized that there should always be a certain amount of fluidity in any set of standards—that changes will come about because of further study and experience. The suggestions which I am, in all humility, putting forth in this paper stem from this point of view and a strong personal conviction that our approach should always be dynamic rather than static.

Since the adoption of this code, purchasers' specifications for equipment of this type have required that the design must conform to these rules. A large majority of these mandatory and advisory rules are explicit and it is proposed only to offer comment on a few of the rules which have been subject to question by builders and users.

The code requirements for hoist brakes are plainly stated; however, there have been occasions where interpretations have been different

CHECK FOR SAFETY:

1. Hoist Brakes
2. Bridge Brakes
3. Trolley Brakes
4. Slewing Brakes
5. Trolley Bumpers
6. Power Disconnects
7. Work Loads
8. Electrical Installations
9. Operator Training

from the generally accepted interpretation. Quoting Section 105, Part 1051—"Two Brakes Required"

"(a) Each independent hoisting unit of a crane shall be equipped with two braking means except worm geared hoist, the angle of whose worm is such as to prevent the load from accelerating in the lowering direction.

(b) One brake shall be applied directly to the motor shaft or some part of the reducing gear and may be either electrically operated or mechanical.

(c) The other brake may be either mechanical or electrical. If mechanical, it shall lock the load when hoisting is stopped, and shall also control the speed during lowering so as to prevent undue acceleration.

Electric dynamic braking for direct current and electric braking for alternating current hoists may be used to control the lowering speed."

Electric Brakes

In the past few years it has been noted in a number of specifications of both builders and users for single drum electric hoist to be used on cranes, whirlers or bridges that the brake requirements specify the use of three braking means for the hoist—a mechanical brake, an electrical brake, and dynamic braking for direct current hoist or electric braking for alternating current hoist. The term electric brake means to a large majority of engineers, designers, mechanics, etc., a friction type brake actuated by electric means. Due to this understanding on the part of many, these rules are frequently interpreted as a requirement for two friction type brakes on each hoist as well as the use of electric dynamic braking for direct current hoist or electric braking for alternating current hoist.

Section 6 of the Code clearly defines an electric brake as "an electric motor acting as a brake by regenerative, counter torque or dynamic means." It is suggested that perhaps a repetition of this definition in Section 105 would aid in a clearer interpretation of this rule on the requirements for two brakes.

On certain special cranes, however, the code requires that three braking means be provided. Quoting Section 115, Part 1154—"Ingot pouring cranes shall be provided

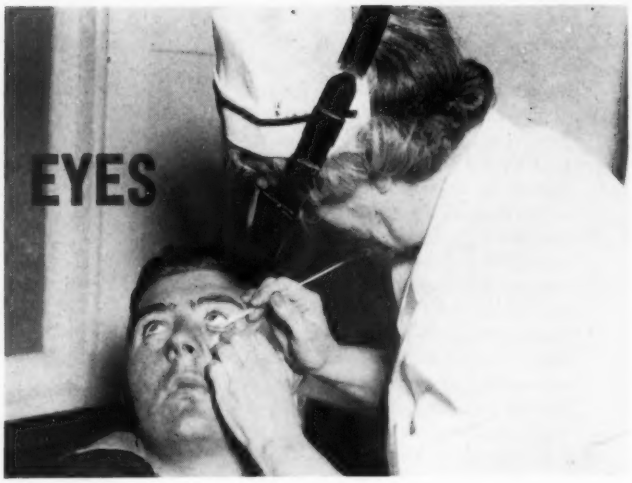
(Please turn to page 37)

A jib crane with electric hoist is used to place finished gear in crate at the Gearing Division of Westinghouse in Pittsburgh preparatory to sealing and shipping.

A 15-ton Whiting cab operated overhead traveling crane with a Cullen & Friestedt sheet lifter is used to unload bundles of sheet steel from gondola cars. Each bundle weighs 10,000 pounds.

An Experienced Industrial Nurse Writes About First Aid Techniques Necessary to Save . . .

CHEMICALLY BURNED EYES



SUSAN C. LEWIS, R.N.,
Charleston, West Virginia

THE place of the trained nurse in the *industrial first aid* organization is rapidly becoming more and more essential. Her duties are many and varied. Therefore it is necessary for her to be thoroughly familiar with all first aid techniques, particularly those having to do with eye injuries.

In this field the *chemically burned eye* is one of the most important. Proper first aid for this injury frequently makes the difference in whether or not it is possible for the ophthalmologist to save that eye.

A chemical burn of the eye may be defined as an injury which results from contact with a chemical either solid, liquid or gaseous.

As first seen by the *industrial nurse*, the patient presents a picture of acute pain, redness of the eye as well as great anxiety concerning the injury. Here it is necessary for the nurse to be calm and sure of herself. This assurance comes from knowledge of the proper treatment.

There are three steps in the care of a chemically burned eye: immediate first aid, dispensary care, and specialized care by the physician.

First Aid Care

The immediate first aid is that which is administered at the scene of the accident. Its purpose is to remove in so far as possible the offending material at once. This is accomplished through the administration of water in large quantities to the eye. The water may be applied to the eye in any number of ways: eye wash fountains which are operated by foot pedals, showers, ordinary drinking fountains, low pressure hoses or from buckets of water which may be dipped by hand. The important thing is *water* applied to the eye promptly and in large quantities. It is well in industry for the employees to know what to do in order that they be of assistance to one another in case of accident. The *chemically burned eye* is quite painful and in order to get the water into it, it is often necessary for a fellow-employee to either hold the lids open or to administer the water or both. Although the nurse usually has no actual part in this step of the treatment, in many cases it lies within her field to teach the first aid.

Editor's note: Miss Lewis' article excellently portrays procedures necessary to save chemically burned eyes as evidenced by its presentation to hundreds of nurses via the magazine, Industrial Nursing. However, if all employees working with chemicals were always protected by the correct type of eye protection, articles such as this need never be written . . .

Dispensary Care

Following this immediate first aid the patient should be taken at once to the central first aid or dispensary. It is here that the *industrial nurse* plays her part and it is a most important part. The eye must be treated at once and the anxiety of the patient alleviated. This anxiety is in part relieved by the calm assurance of the nurse whose first action is the instillation of ½% pontocaine solution into the eye to relieve pain and so lid spasm.

In the dispensary the flushing of the eye is carried out with meticulous detail. Normal saline solution is used which is maintained at room temperature. This is best administered from a large siphon jar with a rubber tipped tube as the flushing should be continued for a period of thirty minutes. During the first fifteen minutes of this controlled flushing the cul-de-sacs are carefully inspected for gross particles which are removed with small cotton swabs.

At the end of the first fifteen minute period the eye is stained with a 2% buffered solution of fluorescin. The damaged cells take on a greenish stain. Should the eye show any stain at this time the flushing is continued for another fifteen minutes and the eye again stained. If it is showing stain at the end of the entire flushing period the eye is considered burned and the patient is

(Please turn to page 41)

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14

SAFETY IN SANDBLASTING

(Part I)

From a manual prepared by
Industrial Hygiene Foundation of America, Inc.
for the
National Industrial Sand Association

SANDBLASTING, as do most industrial operations, requires that safeguards for health and safety be engineered into the equipment. On the whole this has been accomplished satisfactorily in the development of sandblasting apparatus. Available commercial equipment, properly installed and operated, provides complete protection of the operator and makes sandblasting an entirely safe industrial process. There are, however, instances of inadequate installations, improper use of adequate installations, and poor maintenance, which require for their discovery and correction only the light of information.

Sandblasting Enclosures

Sandblasting is used principally in the foundry for cleaning and removing inequalities from castings. However it also finds important application for other purposes such as preparing metal surfaces for special finishes, removal of paint and dirt from old surfaces and several others. This material deals principally with cleaning castings although it applies generally to industrial production blasting. Such blasting operations may take place in:

(1) blasting rooms, or other space provided for the operation, with the operator and the work in the same space and the operator protected by a supplied-air helmet;
(2) in cabinets, with the operator outside the cabinet and manipulating a blasting nozzle and feeding work from the outside to within the cabinet; or
(3) in equipment that requires no operator in attendance during the process, such as sandblast barrels.

The control of dust for each of these three types of operation is discussed herein.

Sandblasting Rooms

It is impossible to reduce the dust concentration in a sandblasting room to a safe level by any practically attainable degree of room ventilation, regardless of type of installation or abrasive used. That is the reason for the fundamental requirement that the blast operator be provided with protective equipment consisting of a helmet or mask connected by hose to an unfailing source of clean air. With a proper helmet and suitable air supply, the worker is completely protected during sandblasting regardless of surrounding conditions.

Room Ventilation

Air is exhausted from sandblasting rooms for three reasons:

(1) to provide adequate visibility for the work;
(2) to prevent escape of dust from the room into adjacent work areas;
(3) to aid in reclaiming the larger useful grains of sand.

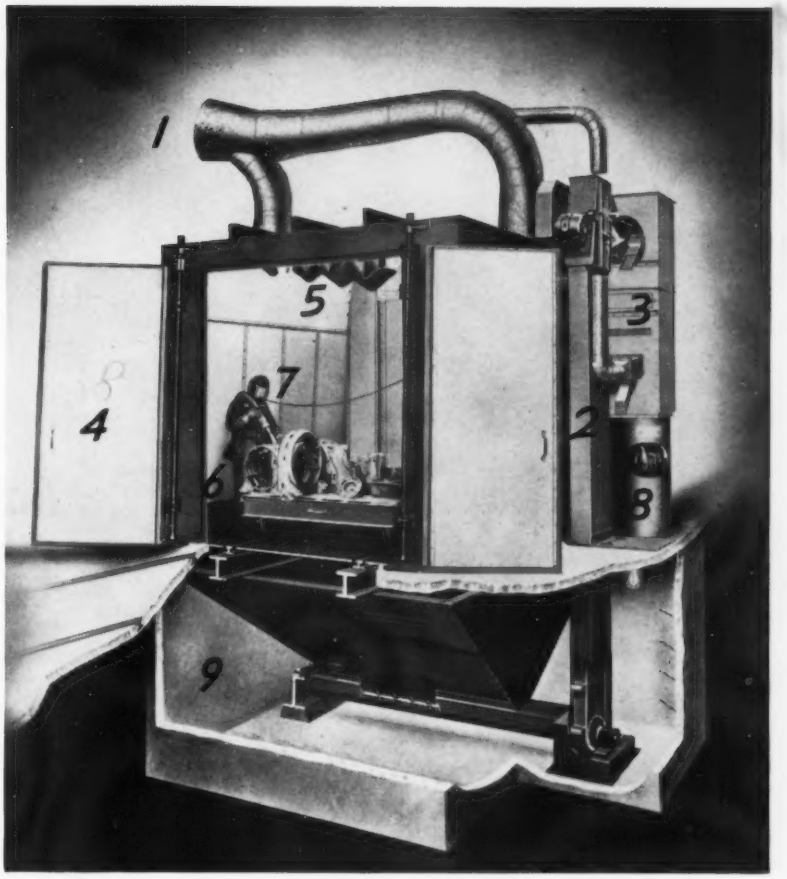


FIGURE 1. SANDBLAST ROOM
(Compare with check list in Table 1)

(1) Exhaust to dust collector
(2) Sand elevator
(3) Sand separator or cleaner
(4) Doors, which should be self closing and self sealing
(5) See openings above for air supply
(6) Note below number passage for air formed by false wall
(7) Workmen with air-fed helmet
(8) Blast machine
(9) Note hopper and conveyor system for recovering used sand

The first of these is the principal objective; with sufficient exhaust ventilation to maintain adequate visibility, escape of dust is not likely to occur.

Experience indicates that the air flow rate for a sandblast room should not be less than about 80 cubic feet of air per minute per square foot of floor area in the room, when the air movement is essentially vertical and downward from air supply openings in the ceiling. In long tunnel-type blast chambers air may enter at one end and be exhausted from the opposite end. In this case the ventilation rate is based on the area of the vertical cross-section of the room, and should be about 80 cubic feet per minute per square foot. These values are based on a single blaster. If there is more than one blaster the ventilation rates should be increased in proportion.

Air is best exhausted through rectangular openings formed by false walls which extend to within a foot or so of the floor. That is one type of conventional design, giving a desirable downward flow of air in the sandblast room, tending to speed the fall of the dust particles, and at the same time permitting the fresh air supply to reach the level of the operator before reaching the work table level. See Fig. 1. The exhaust duct is connected at the ceiling to the vertical chambers thus provided, and the false walls provide a baffle between the sandblasting area and the exhaust outlet. The vertical space between room wall and false wall acts as a settling chamber in which large abrasive grains that ricochet into the space can settle out by gravity. The cross-sectional area of this space should be such that the vertical velocities of the air do not exceed about 500 to 1000 feet per minute, thus avoiding lifting of large grains in the air stream to the exhaust system.

It is inadvisable to attempt to combine room ventilation with cleaning of the abrasive by exhausting air from collecting hoppers below the floor grating. To do so results in undue loss of abrasive and excessive wear of the exhaust duct, and, moreover, cleaning of spent abrasive is too important a function to be performed in such haphazard manner.

Dust Leakage

Properly designed blasting rooms include air inlets through ceiling louvres of various types, baffled to prevent outward passage of abrasive while, at the same time, permitting entrance of air for ventilation. The size of these openings is restricted so that their total relative to the room ventilation rate will provide velocities through them of 300 to 500 feet per minute. This will also be the approximate velocity through any cracks there may be in the housing. Such velocities are entirely adequate to prevent outward escape of dust *except near the blasting point*, where the full force of the blast

(Please turn to page 43)

THE FIRE THAT DESTROYED 40 YEARS

by
MYRICK LAND

FIRE PROTECTION
FOR
INDUSTRY SECTION

IT was seven minutes before quitting time in the Runyon Company factory, and most of the 300 workers began cleaning up around their machines.

Franklin, the shop janitor, kept glancing at the clock. His wife was ill, and he wanted to get home as soon as possible. He picked up several rags and some scraps of paper from the floor, and dropped them into an open wastebasket. He reminded himself that he must burn the waste first thing in the morning, and decided that he might come in a bit early to catch up on a few things he hadn't taken care of during the day.

For one thing, he was still worried about that five gallon pail of gasoline which had been placed in the small broom closet. The foreman had mentioned it to everybody in the shop, and had warned them again about the no smoking rule. But still . . .

Franklin heard the five o'clock whistle. He was already washed up, so he grabbed his hat and hurried toward the door.

He had gotten nearly to the street-car stop when he heard the explosion. "It's that gasoline!" he thought, and rushed back towards the plant.

He saw three hundred panic stricken men shoving, desperately, toward the main exit. They had forgotten the two smaller side exits in the sudden rush to escape the sweeping flames. Three men died under the trampling feet of their fellow workers, after escaping both the explosion and the flame.

Twelve others were dead when they finally reached the hospital. Another five workers spent months in hospital wards, breathing with great pain, their lungs seared by the hot smoke.

Franklin spoke to one of the men who sat watching the flames devour the factory.

"How did it happen, Charlie? How did it start?" he asked.

"Somebody decided to grab a quick smoke just before leaving for the day," Charlie said. "I think it was one of the new men. He saw the boss coming towards his machine, and he tried to get rid of the cigarette in a hurry. It landed in the wastebasket, and something in there caught fire. All I saw was one quick flame—and then the explosion. You know, that gasoline can—and it was nearly 150 feet away from the wastebasket!"

The explosion and fire in the Runyon Company factory did not end there. It will not end for years to come.

The lives of literally hundreds of people were permanently affected by the careless smoker, the worried janitor, and the incautious foreman.

First, fifteen men lost their lives. Fifteen families were left without support.

Five more men were condemned to long months on hospital beds, followed by years of ill health. Their earning prospects will never be as bright again.

The other workers suffered also, even though they escaped direct injury by the explosion and flames. Older workers whose skills had gained them top jobs at the Runyon Company plant had to try to start in again at other factories. Some men had to move to other towns in search of work. And the loss of several weeks wages during the interval between jobs ate into savings which had been accumulating to educate children.

Fires such as this one cost American industry a quarter of a billion dollars last year, drove many concerns out of business, killed and maimed thousands of workers, and left thousands of others jobless. Most of these fires were preventable.—*(National Board of Fire Underwriters photo).*

The Runyon Company lost hundreds of customers who could not wait for the plant to be rebuilt. Much of the machinery could not be replaced at all; where machinery was available, the cost had risen 100 per cent or more.

In less than an hour's time, forty years of work was laid waste.

Yet, today, in hundreds of other factories and plants, other careless smokers and worried janitors and incautious foremen are endangering the lives, safety, and happiness of thousands of workers and employers by ignoring a few elemental rules of fire prevention.

Franklin, the janitor, should have realized that fires don't wait for tomorrow. They start today. And the time to get rid of fire-inviting waste paper, rags, and trash is immediately.

The foreman should have remembered that gasoline is one of the most deceptive of explosives. Like benzine and naphtha, gasoline gives off heavy vapors which can flow along the floor 200 feet or more to open flame and then flash back to the container.

The careless smoker should glance at a few fire records. He would discover that every cigarette, pipe, cigar, or match is potentially as dangerous as a loaded gun. And he should also realize that a discarded cigarette, while it still has a spark of fire, is even more deadly than it is while he's smoking it.

The other men in the plant were not blameless. They had failed to plan among themselves how they would act in case of emergency. Three deaths can be traced directly to this failure. Panic can be as deadly as spreading flames, and a few minutes of fire drill each week could have prevented it.

In other factories and plants, a variety of other fire hazards must be kept in mind. The National Board of Fire Underwriters advises owners and foremen to keep all aisles and stairways clean and clear, to prevent the spread of fire and to provide ready exit. Stairways and vertical shafts should be equipped with self closing fire retardant doors.

The Board has also listed these other life-saving rules:

Don't allow machinery to run unattended. Notify the foreman of any unusual behavior or heating of equipment.

Main supplies of paints and oils should be kept in a separate room, constructed according to National Board of Fire Underwriters' standards.

No more than one gallon of gasoline—for actual, present needs—should be kept on hand. The main supply should be kept outside and underground.

Metal pans should be kept under machinery where oil is used extensively. Sawdust and shavings should never be used.

Blow torches should be refilled outdoors and from approved cans. They should never be left burning unattended.

Blown fuses should be replaced with new fuses of proper capacity and never should be bridged with coins or other metals. Workers should remember that fuses are safety valves; burned out fuses indicate a short circuit or overload.

Packing materials should be stored in covered metal cans, metal lined bins with self-closing cover, or in fire resistant vaults.

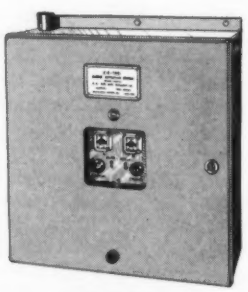
(Please turn to next page)

Teach fire prevention of course ...but be sure you have modern fire protection by

All the training, all the good housekeeping requirements are necessary. Even then . . . a stray spark or short circuit just seems to happen . . . a fire starts. That's when you need modern, quick-acting C-O-TWO fire protection. C-O-TWO is dry, clean carbon dioxide gas . . . snuffs out the fire in seconds, then disappears without a trace. It is non-contaminating, non-damaging, non-conducting and non-corrosive.

There are areas in your plant that particularly need C-O-TWO fire protection: spray booths, dip tanks, solvent baths, electrical equipment enclosures, lift trucks, pump rooms, anywhere there's danger of flammable liquid or electrical fires. For complete fire protection in enclosed areas such as record vaults and store rooms, install the new C-O-TWO Combination Smoke Detecting and Fire Extinguishing System. This new system is a 24 hour a day automatic watchman.

Let an expert C-O-TWO Fire Protection Engineer advise you on your fire protection needs now, before fire strikes. Just clip this advertisement to your letterhead or calling card and mail for complete information about modern C-O-TWO Fire Protection Equipment. Remember fire doesn't wait . . . act now!



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Oily or paint-soaked clothing should never be worn near open flames, furnaces, or welding operations.

Observation of these rules would eliminate most of the factory fires and business fires which burned up more than a quarter of a billion dollars worth of property last year, the National Board of Fire Underwriters points out. The Board emphasizes that stopping fires would save lives, save health, and save jobs.

COMING SAFETY CONVENTIONS . . .

Mar. 6-8, Tampa, Fla.
Tenth Annual Southern Safety Conference. (Hillsboro Hotel). Braxton B. Carr, secretary-treasurer. 2120 First Ave., North Birmingham 3, Ala.

Mar. 9-10, Houston, Tex.
Tenth Annual Texas Safety Conference. (Rice Hotel). George Clarke, managing director, Texas Safety Assn., Inc., 815 Brown Bldg., Austin, Tex.

Mar. 14-15, Boston
Twenty-eighth Annual Massachusetts Safety Conference. Edgar F. Copell, president-director, Massachusetts Safety Council, 31 State St., Boston 9, Mass.

Mar. 15-16, Philadelphia
Fifteenth Annual Philadelphia Regional Safety Conference and Exhibit (Bellevue-Stratford Hotel.) Walter W. Matthews, managing director, Chamber of Commerce Safety Council, N.E. Corner 17 and Sansom Sts., Philadelphia 3, Pa.

Mar. 29-April 1, New York
Nineteenth Annual Greater New York Safety Convention. Paul F. Stricker, executive vice-president, Greater New York Safety Council, 60 East 42nd St., New York 17.

Apr. 4-5, Toronto, Ont.
Industrial Accident Prevention Associations, Annual Convention. (Royal York Hotel.) R. B. Morley, general manager, 600 Bay St., Toronto 2, Ontario.

April 5-9, Detroit, Mich.
American Association of Industrial Nurses, Inc. (Book Cadillac Hotel). Gladys Dunmore, Exec. Secy. 654 Madison Ave., New York.

April 12-14, Columbus, O.
All-Ohio Safety Congress. James H. Fluker, superintendent, Division of Safety and Hygiene, Industrial Commission of Ohio, Columbus, Ohio.

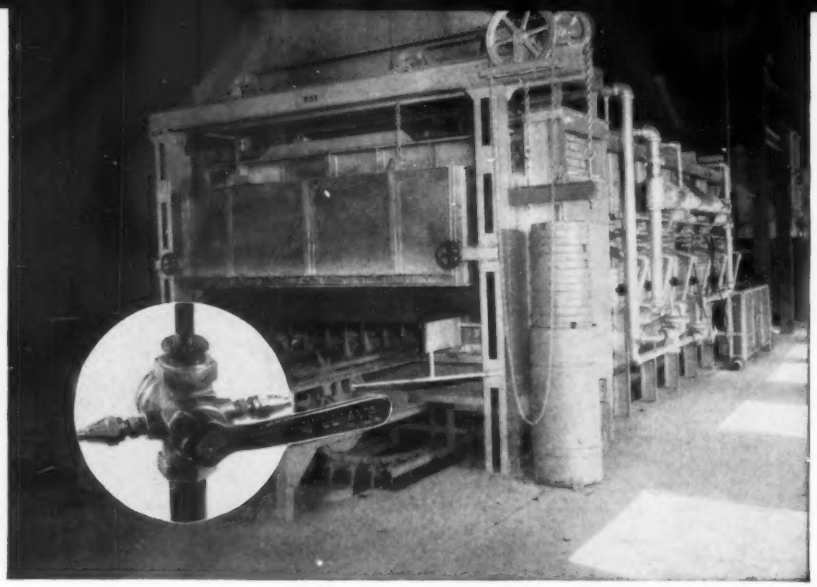
TABLE OF MATERIALS SUBJECT TO SPONTANEOUS HEATING

Prepared by N.F.P.A. Committee on Spontaneous Heating and Ignition

The following table lists some of the more common materials that are subject to spontaneous heating in varying degrees. The list is not intended to be entirely comprehensive and the omission of any material or combination of materials from the table does not necessarily indicate that these may not be subject to spontaneous heating. The table is based on ordinary atmospheric conditions that may be encountered in transportation and storage; it does not purport to include unusual materials under special conditions where abnormally high temperatures, etc., may exist. Such cases are beyond the scope of this present compilation.

Part 2

Name	Tendency to Spontaneous Heating	Usual Shipping Container or Method of Storage	Precautions Against Spontaneous Heating	Remarks
Fish Scrap	High	Bulk, Bags	Avoid moisture extremes.	Scrap loaded or stored before cooling is extremely liable to heat.
Grain (various kinds)	Very slight	Bulk, Bags	Avoid moisture extremes.	Ground grains may heat if wet and warm.
Hay	Moderate	Bulk, Bales	Keep dry and cool.	Wet or improperly cured hay is almost certain to heat in hot weather. Baled hay seldom heats dangerously.
Hides	Very slight	Bales	Keep cool and dry.	Bacteria in untreated hides may initiate heating.
Inorganic Chemicals and Chemical Mixtures	Variable	Bulk, Glass Metal Containers	Effects may be produced or determined experimentally.	Many causes such as moistures, absorption, unstable mixtures, slow oxidation, etc., may cause heating and fires.
Iron Pyrites	Moderate	Bulk	Avoid large piles. Keep dry and cool.	Moisture accelerates oxidation of finely divided pyrites.
Ixtle	Very slight	Bulk, Bales	Keep cool and dry.	Heating possible in wet material. Unlikely under ordinary conditions. Partially burned or charred fiber is dangerous.
Jute	Very slight	Bulk	Keep cool and dry.	Avoid storing or loading in hot wet piles. Partially burned or charred material is dangerous.
Lamp Black	Very slight	Wooden Cases	Keep cool and dry.	Fires most likely to result from sparks or included embers, etc. rather than spontaneous heating.
Lanolin	Negligible	Glass, Cans, Metal Drums, Barrels	Avoid contact of leakage from containers with rags, cotton or other fibrous combustible materials.	Heating possible on contaminated fibrous matter.
Lard Oil	Slight	Wooden Barrels	Avoid contact of leakage from containers with rags, cotton or other fibrous combustible materials.	Dangerous on fibrous combustible substances.
Lime,unslaked	Low	Barrels, Bulk	Keep dry.	Wetted lime may heat sufficiently to ignite wood containers, etc.
Linseed	Very slight	Bulk	Keep cool and dry	Tendency to heat dependent on moisture and oil content.
Linseed Oil	High	Tank Cars, Drums, Cans, Glass	Avoid contact of leakage from containers with rags, cotton or other fibrous combustible materials.	Rags or fabrics impregnated with this oil are extremely dangerous. Avoid piles, etc. Store in closed containers, preferably metal.
Metal Powders	Moderate	Drums, etc.	Keep in closed containers.	Moisture accelerates oxidation of most metal powders.
Metal Turnings	Practically negligible	Bulk	Not likely to heat spontaneously.	Avoid exposure to sparks.
Manure	Moderate	Bulk	Avoid extremes of low or high moisture contents. Supply ventilation of piles.	Avoid storing or loading uncooled manures.
Menhaden Oil	Moderate to high	Barrels, Drums, Tank Cars	Avoid contact of leakage from containers with rags, cotton or other fibrous combustible materials.	Dangerous on fibrous products.
Manomers for Polymerization	Variable	Drums, Tank Cars	Keep cool. Inhibit efficiently.	Heating from spontaneous polymerization may be caused by heat or light.
Mustard Oil, Black	Low	Barrels	Avoid contact of leakage from containers with rags, cotton or other fibrous combustible materials.	Avoid contamination of fibrous combustible matters.
Oil Cloth	Very slight	Rolls	Cool thoroughly before rolling.	Coated cloths are comparatively safe unless rolled while hot.
Oiled Clothing	High	Fiber Boxes	Dry thoroughly before packaging.	Dangerous if wet material is stored in piles without ventilation.



FIRE PROTECTION FOR INDUSTRY SECTION

SAFETY CONTROL COCK FOR GAS MULTI-BURNER SYSTEMS

New System Developed by Factory Mutual Engineers Eliminates Danger of a Common Type of Explosion in Multi-Burner Units

A NEW and positive method of preventing fuel explosions in multi-burner, gas fired industrial furnaces, ovens, dryers, and boilers has been developed by the **Inspection Department of the Associated Factory Mutual Fire Insurance Companies.**

The type of explosions prevented are those which may result if a burner cock is accidently left open when the main gas supply is turned on, and if there is then any delay in applying the lighting torch. Such an interval would permit an explosive gas-air mixture to form which would be ignited when the torch is applied.

The new method assures that all burner cocks will be closed before the main gas supply can be turned on. A new type of safety control cock has been developed and is now commercially available, which replaces the ordinary burner cock.

Factory Mutual Laboratories studied 83 fuel explosions in heat-treat furnaces over a 10-year period.

Forty of the explosions occurred during "lighting-off", a term used to designate the operation of starting the furnace.

Of these forty, twenty-five were caused by one or more burner cocks being accidentally left open when the main gas valve was turned on.

It is this type of explosion that can be prevented by the system described in this article.

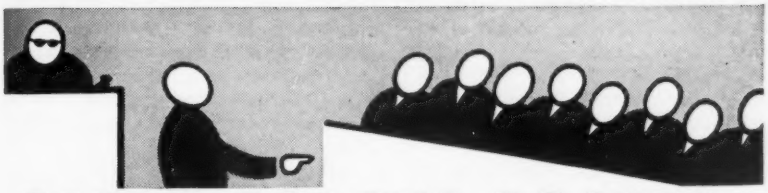
This cock has side ports; and the side ports of all cocks are connected with copper tubing. One end of the line of tubing is connected to the main gas line on the supply side; the other to a pressure switch.

How the System Operates

In "lighting-off", or starting the furnace, the operator first turns gas into the small line connecting the cock side ports. If the cocks are fully closed as they should be, gas flows through the cocks by way of the side ports and operates the pressure switch. This in turn energizes the electric valve on the main gas line, so the operator can open it, which must be done by hand.

If one of the cocks happens to be even partly open, the pressure switch will not operate and the electric valve cannot be opened.

(Please turn to page 36)



RIGHT OFF THE DOCKET

Smallpox Innoculation Results In Injury

CLAIMANT was a regular employee of the company on April 22, 1947. At that time there was a prevailing smallpox scare in the city of Ashbury Park, New Jersey, where the complainant Mary Saintsing was employed. The smallpox scare was more or less nation wide. There was a general demand upon the part of public health authorities for popular innoculation and many people responded by submitting themselves to innoculation. Many people sought the services of their own physicians for this purpose.

In the interest of public health and to facilitate a mass system of vaccinations, the public health authorities placed at the disposal of many employers such as the Steinbach Company a consignment of vaccine. The company obtained a supply of vaccine and made known to its large staff of employees that they could come and be vaccinated without charge by a doctor furnished by them. This service was taken advantage of by a very large number of employees. There was no compulsion imposed on any employee. At least 90% of the company's employees proceeded to be vaccinated on the premises by the physician furnished by them at the expense of the company. One of these employees was the claimant.

Subsequent to the vaccination the claimant developed a severe reaction. This reaction while not common, does appear in a number of similar cases. A notice addressed to all company workers was posted on the bulletin board on the subject of smallpox innoculation in which the personnel director advised the employees that the company would provide free innoculation. Beneath the sign appeared the following. *"We, the undersigned, do hereby certify that this innoculation for smallpox is a voluntary action and that the Steinbach Company is in no way responsible for the results therefrom."* On one of these sheets of paper appears the signature of the claimant.

Question before the Court is whether or not under the circumstances claimant's injuries resulted by reason of an accident arising out of and in the course of claimant's employment.

The Court concluded that the injuries did not arise out of an accident occurring out of the employment because it did not ensue from a risk reasonably incident to the employment. There was nothing about the innoculation which was directly connected with the employment or one extraordinary in character, indirectly connected therewith because of its special nature. Such a risk may include a risk common to all mankind, and it is not a conclusive test that the danger is common to all whether in or out of employment and the peril may be normally incident to the service, and yet be one faced by members of the public. This certainly was not an accident where the danger was one to which the claimant was exposed because of the nature, conditions or obligations of the employment. The innoculation was not a thing bargained for nor was it in the view of the parties as a consideration for the contract or a measure related to the qualifications of said position held by the claimant.

The risk of danger was not one to which the employee was exposed because of the nature of her employment when she availed herself on a voluntary basis of the opportunity afforded to her out of the goodness or generosity of her employer. What she was doing at the time was not in the performance of a duty under the employment contract, nor was it reasonably incidental to such employment, thus a casual relationship is lacking. Generosity alone to one's employee does not render one liable for compensation under the act for injury suffered while in the enjoyment of the favor, even though there is a reciprocal good will and a heightening of morale. The company is not an insurer of the health of an employee.

Claim denied.

Saintsing vs. Steinbach Company,
County Ct. of Monmouth, N. J.
October 14, 1948
61 Atlantic Reporter, Second Series, Page 580

Claimant Must Show How Loss of Vision Occurred

GEORGE MOSES on March 16 or 17, 1943, was using a wire brush machine which removes rust from metal by means of a revolving wheel. He wore a shield which fitted over his head and rested on his chest. About 2:00 in the afternoon, he felt a sharp pain in the right eye while wire brushing some angle irons. He went to the company's first aid station where a physician removed something from his right eye. He was treated by the physician until the following October until presently he was unable to see out of his right eye.

Claimant admitted on cross examination that in the early part of 1943, he was absent from his work for three weeks suffering from grip and it was after that absence, that he got the particular pain in his right eye. After he had been away from work for about eleven days, he returned for treatment which was believed to be grip in the eye. He returned to work on April 6, 1943. Two of his fellow workmen remembered that on March 16, 1943, he had complained of his eye at which time he went to the first aid station and came back with a bandage on his eye.

Claimant's physician contended that they found a scar on the right cornea covering the pupillary arc which made it impossible to see the interior of the eye, and which caused the total loss of useful vision and that in their opinion loss of vision was caused by particles entering the eye and that the scar was caused by inflammation or ulceration, admitting that ulceration could be caused without the presence of a foreign body in the eye.

Company produced eye specialists who both concluded that the inflammation of the eye was due to the grip which he had been suffering with prior to this examination on March 22nd.

The burden of proof was with the claimant to establish that the condi-

tion of his eye which he complained of was the result of an accident arising out, of and in the course of employment. Inasmuch as there was persuasive testimony contrary to his contention in that the scar on claimant's eye and his condition did not result from the foreign substance entering it while he was operating the wire brush machine as he stated and sought to establish, or that it resulted from a foreign substance entering the eye while he was in the service of the company, but that it was produced by some bodily infectious disease.

There was nothing to indicate that the condition produced the loss of vision, nor that loss of vision resulted from trama.

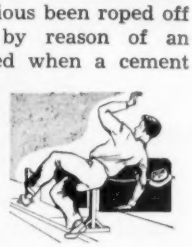
Claim denied.

Moses vs. Federal Shipbuilding & Drydock Company, Ct. of N. J., September 8th, 1948

31 Atlantic Reporter, Second Series, Page 44.

Compensation Case vs. Common Law Action

SWEAT was employed as an office worker for the Lloyd-Thomas Company who maintained offices next to the building occupied by the Defendant Company. After leaving work at the close of the day, Sweat proceeded in his general route and while walking over an area which had the day previous been roped off and barricaded by reason of an emergency created when a cement coping fell off the roof of the building, he tripped and fell into the street, and was severely injured. A hard rain had fallen the preceding day of the accident and the concrete near the area roped off was covered with mud and was slippery.



There is no question that the portion of the sidewalk upon which the claimant was walking at the time of the accident was over the area that the company invited the public to walk. Its action excluded the public from all the safe areas of the sidewalk and parkway and limited it to that portion which proved to be dangerous.

A common law action was filed against the company who among their many defenses contended that the action was barred by reason of the Workmen's Compensation Act. Question then arises as to whether or not the injuries arose out of and in the scope of claimant's employment.

It is generally conceded that an employee is not in the course of employment unless within the period thereof, he is reasonably performing the duties for which he was hired and is engaged in doing something incidental thereto at a place where his employment makes it reasonably necessary to be done.

A risk is not incidental to employment within the Workmen's Compensation Act unless it is connected with what employee has to do in fulfillment of his contract of service. Where servant voluntarily and without direction from his employer or without knowledge or acquiescence departs from the duties for which he is hired and undertakes to do an all together different work, claimant does not come within the protection of the Workmen's Compensation Act.

In the instant case, Sweat was employed as an office worker and fell on parkway outside of adjoining building while walking to street car after work. At the time he was not doing anything to further his employment. He was exposed to the same risk of injury as other pedestrians. He was, therefore, not precluded from starting an action against the owner of the building for such injuries.

TYPE J-1 EYESHIELD, shown with 6-inch clear visor.

"They're Not Kidding"

3 VISOR DEPTHS:

No, safety experts are not kidding when they say that eye injuries cost far more than the cost of adequate protection.

The Featherlight Type J-1 Eyeshield is used for metal pouring and finishing, spot, gun, and flash welding, wood working, etc.

The extruded plastic headgear, moisture proof and easily sterilized, has sweat band for greater comfort. A pivoted spark deflector which protects the forehead carries the replaceable visor, snapped to the outside. This visor is made of fire repellent clear plastic, made in three thicknesses; also in light, medium, and dark green .020" thick only. All are available in three depths, are 11 inches wide for full face protection, and have wire-reinforced binding.

Jackson Eyeshields are sold through distributors in principal cities of the U.S. and Canada.

3 VISOR THICKNESSES:
.020"
.030"
.040"

JACKSON
PRODUCTS
WARREN·MICHIGAN

SAFETY GOGGLES · SPECTACLES · EYESHIELDS

His employer had no control over his movements, nor did he direct him at the time the accident occurred. There was nothing in the nature of the claimant's work as an architectural appraisor that exposed him to the risk of injury greater than that to which the general public was exposed. The risk was actually the same as the other pedestrians were exposed to, in using the north side of the street.

Many people used the pathway prior to and after claimant was injured, and all of them, however, diversely employed were subject to the same risk. Nothing in the record indicates the connection between the employer and injuries received as apparent to the rational mind.

The company's claim that the action should be barred was denied as the record was clear and convincing that the accident did not arise out of claimant's employment but as the result of negligence of the company in maintaining their building.

Common Law action was sustained.

Sweat vs. Aircraft and Diesel Equipment Corporation, Appellete Ct. of Ill., June 21, 1948
81 N. E. Reporter, Page 8, Second Series

Injured While Helping Stalled Motorist

MERRITT was employed as a welder for the Marky Construction Company. On the date of the accidental injury, he was engaged in welding for the Sinclair Oil Co., and had completed his job at approximately 12:30 A. M. He was returning to Weewoka in the welding truck with a fellow employee, Willie Mitchell. Merritt was signaled by a James Hampton, a driver of a stalled automobile. He proceeded for a distance of about 100 feet in front of the automobile of James Hampton and stopped his welding truck. There is some dispute as to what occurred thereafter.

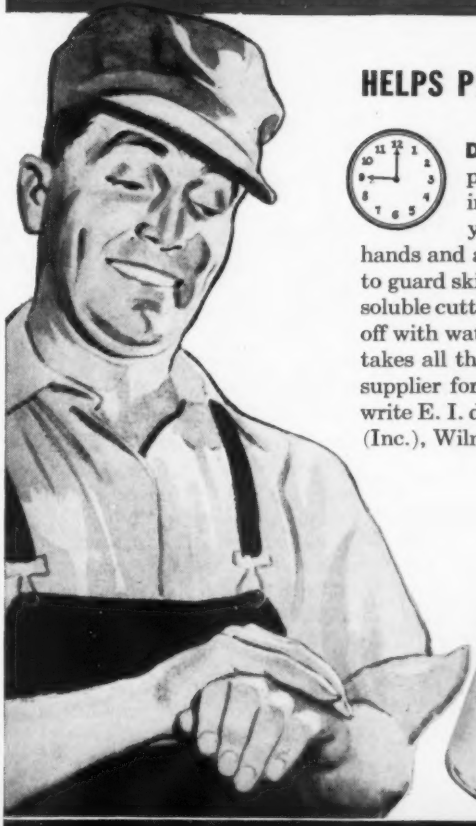
Hampton, Mitchell and two other witnesses testified that Merritt went to the automobile of Hampton and thereafter obtained some gasoline and gave the same to Hampton in a can, that while he and James Hampton were attempting to start the automobile by drawing the gasoline through the carburator, the engine backfired and the gasoline caught fire. In the confusion that resulted, Merritt stepped into the path of a pick-up truck driven by a Mr. Armstrong and sustained injury for which he seeks award.

The claimant, however, stated that he got out of the driver's side of the welding truck and immediately upon stepping on the highway was struck by the pick-up truck which was driven by Mr. Armstrong. The claimant did not attempt to develop a theory of any custom of the employer to admitting or allowing its employees to go to the assistance of motorists in distress, but relied on the fact that a Sinclair Oil Company man wanted him to go onto another job.

There is nothing to reveal that the accidental injury arose out of and in the course of employment and no injury is deemed to be compensable unless it results in a risk reasonably incidental to the employment and unless there is apparent to the rational mind, a causal connection between the conditions under which the work is required to be performed and the resulting injury. Claim denied.

Marky Construction Co., et al vs. Merritt, et al, Supreme Ct., of Oklahoma, Sept. 28, 1948
Pacific Reporter, Second Series, Page 217

PROTECTS HANDS
against oil, grime, paint



HELPS PREVENT TIME LOSS!

Du Pont PRO-TEK hand protective cream acts like an invisible work glove. Have your workers rub it on hands and arms before starting work, to guard skin against paint, grime, insoluble cutting oils, etc. Easily washed off with water when the job is done—takes all the grime with it. Ask your supplier for Du Pont PRO-TEK. Or write E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

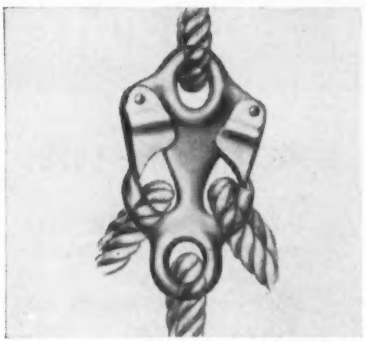
DU PONT
REG. U.S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING THROUGH CHEMISTRY

PRO-TEK
REG. U.S. PAT. OFF.
HAND PROTECTIVE CREAM

New PRODUCTS

For further information on any of these products, simply circle the key number at the end of each item on the special post card enclosed with this issue.

NP-1 . . . HOISTING SNAP—The R. H. Buhrke Co. have announced an entirely new multiple purpose snap for hoisting materials to above-ground work levels. This device makes possible an endless hand line, eliminating the tying of knots. Designed so it cannot catch on service wires while raising or lowering. It



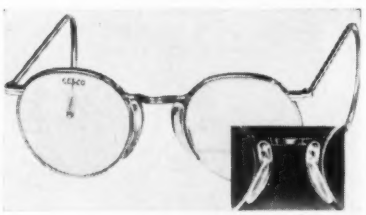
is tested to 2500 lb. between eyes and 1000 lbs. on each hook and upper eye.

For further information please circle NP 1 on the special postcard enclosed in this issue.

NP-2 . . . SOAP DISPENSER — Chemical Specialties Inc. have announced that considerable savings in liquid or scrubber soap costs can be had by using their Practi-Kreme Dispenser System. The attractive, rugged, cast aluminum dispenser, loaned free to Practi-Kreme users, are installed in the plants near the machines to dispense the cream before work as a protector and after work as a deep-penetrating, highly effficient skin cleaner.

For further information please circle NP 9 on the special postcard enclosed in this issue.

NP-3 . . . SAFETY GOGGLE — Chicago Eye Shield Company's latest spectacle-type goggle is said to feature a new comfort bridge that virtually "floats" the goggle into correct position. The broad-bearing jumbo pads plus balanced suspension of the frame distribute the light weight of the goggle evenly across the nose. CESCO Super - Safety lenses add to the protective features of the goggles, which are available



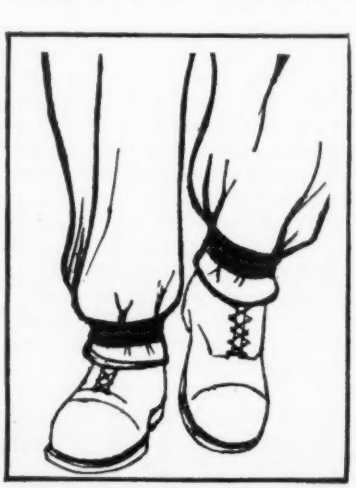
in three bridge widths and three lens sizes to provide correct fit for various facial contours.

For further information please circle NP 3 on the special postcard enclosed in this issue.

NP-4 . . . DRY CHEMICAL FIRE EXTINGUISHER—A brand new dry chemical fire extinguisher has just been announced by American-LaFrance-Foamite Corp. According to claims of the manufacturer, it has many new, outstanding advantages such as longer range, longer duration of discharge, more complete discharge of the dry chemical contents, gas-tight, all-internal expelling gas connections, built-in safety disk and is lighter in weight. The dry chemical is non-toxic, non-corrosive, a non-conductor of electricity and will not flash. This unit bears the Underwriters' Laboratories label and is rated B-1 and C-1. Recommended for flammable liquid and electrical fires.

For further information please circle NP-4 on the special postcard enclosed in this issue.

NP-5 . . . SAFETY LEG BAND — Helmerichs Supply Co. announce that their Dispenza Safety Leg Bands prevent accidents caused by flapping pantlegs or coatsleeves catching in moving machinery or other hazardous objects. The device is said to be used extensively throughout industry. It is recom-



Hot Mold Handlers

mitts

SAFEGUARD No. 14730

We built these one finger mitts especially for handling hot molds, and a lot more hot things too. We make them from horsehide split . . . no other leather can stand the gaff so well. And on hot jobs, this specially tanned horsehide is far less likely to harden, shrink and split. *These mitts LAST.*

At the same time, they're flexible, comfortable to wear, don't have to be broken in. The wool lining keeps out heat, keeps hands cool. Jumbo size makes them easy to put on, take off, gives hands plenty of ventilation. Palm seam and heel of hand have extra reinforcement.

They are well made one finger mitts. Manufactured with 2 inch cuff (No. 14883), 4 inch gauntlet (No. 14730), 6 inch gauntlet (No. 14844). Also available in glove and mitten styles. Sizes for both men and women.

Write for catalog. We are engineers and manufacturers of a complete line of safety clothing. Tell us your requirements.

Industrial
GLOVES COMPANY
Main Factory: 1805 Garfield Blvd., DANVILL, ILLINOIS

(In Canada: Safety Supply Co., Toronto)

mended for miners, lumbermen, steel workers, railroaders, quarry men, construction workers, utility men and others.

For further information please circle NP 5 on the special postcard enclosed in this issue.

NP-6 . . . HEAT MASK—Mine Safety Appliances Co. announce that their new Heat Mask provides better protection, comfort and free vision for workers around blast furnaces, cupolas, heating furnaces, soaking pits and other intensive heat areas. Affording full face and heat protection with unobstructed vision, the mask is made of 30 mesh steel screen which deflects heat away

from the wearer and prevents infrared burns. Weighing only 18 oz. and fitted with a fibre chin rest, for adjustable headgear, the MSA Heat Mask is said to provide the utmost in wearer comfort.

For further information please circle NP 6 on the special postcard enclosed in this issue.

NP-7 . . . SUCTION TUBE — Torit Mfg. Co. has designed a new suction tube for connecting its self-contained Dust Collectors to wheels or surface griders, tool and cutter grinders and other machines that cannot

HANDEEZ

REMOVES SHOP GRIME *SAFELY!*

Don't confuse HANDEEZ with ordinary harsh abrasive-action hand cleaning compounds. HANDEEZ works differently—through a gentle emulsifier blended with a sterilized vegetable emollient. It **lifts** grime from the pores, leaving skin tissue unharmed and unbroken by tiny crevices which invite infection. Cutting oils and other deep-seated shop grime yield readily to the HANDEEZ formula which spells prompt, efficient cleansing with the added skin-safety factor.

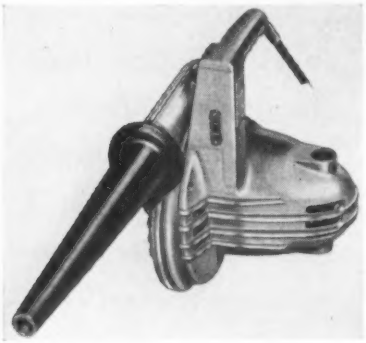
Write for the booklet "Be Kind to These Hands."

THE C. B. DOLGE CO.
WESTPORT, CONNECTICUT

be properly hooded. These assemblies have duck covered hose for greater flexibility. The unit makes a very compact arrangement and permits placement of the nozzle directly in the dust stream with a minimum of interference to working operations.

For further information please circle NP 7 on the special postcard enclosed in this issue.

NP-8 . . . LIGHT-DUTY CLEANER—A new light-duty "Hand Type" cleaner for use in stores, offices, repair and service shops and light



factory jobs is announced by Ideal Industries, Inc. Made to highest industrial standards, it is said to have all the strength and stamina found in larger power models, yet is extremely light in weight, well balanced and easy to handle. This unit has plenty of power for removing grit, dust and dirt from machines, shelves, overhead pipes, etc.

For further information please circle NP 8 on the special postcard enclosed in this issue.

NP-9 . . . FIRST AID UTILITY JARS—Described as "first aid for the first aid station", General Scientific Equipment Company's utility jars are said to be developed to assure

cleanliness to first aid stations and infirmaries and to provide a degree of convenience obtainable in no other way. The most frequently used supplies—cotton, gauze bandages, applicators and tongue depressors can be kept in a handy, open location without danger of contamination. Jars are made of crystal glass and the amount of supplies in each container is always visible at a glance. Chrome plated covers are supplied at a slightly increased cost per set.

For further information please circle NP 9 on the special postcard enclosed in this issue.

NP-10 . . . SUGGESTION BOX—The Elliott Service Co. have recently designed a modern, stream-lined suggestion box, said by the manufacturer to be the latest in design and appearance, with either one, two or three panels and available in attractive hammer-tone silver finish on heavy gauge steel. Posters and bulletins are displayed in a burnished stainless steel frame. The unit is flexible so that the steel suggestion receptacle and panels can be used

separately if desired.

For further information please circle NP 10 on the special postcard enclosed in this issue.

Here's the Handy DAYTON "ROLL-ALONG" SAFETY LADDER

IDEAL FOR THE STOCK ROOM

. . . The Dayton Roll-Along Safety Ladder with its rubber tired swivel casters can be speedily moved in any direction with practically no effort.

Safety shoes with renewable treads hold ladder permanently and safely in place while ladder is occupied.

Constructed of tested airplane spruce throughout and reinforced with steel braces for additional safety. Folds compactly for convenient storing. Available in sizes 3-ft., 4½-ft. and 6-ft.

Elevating auxiliary platform which folds back in main platform adds height if desired. These ladders are being used in many of America's largest plants. See for yourself! Write today for bulletin.

For Safety's Sake . . . **consult our SAFETY DEPARTMENT . . . we have the complete line of safety equipment for your every requirement.**

DAYTON SAFETY LADDER CO.

2337 GILBERT AVE., CINCINNATI 6, OHIO
IN CANADA—SAFETY SUPPLY COMPANY—TORONTO

For complete information, just check any or all items listed, and send us the coupon.

MAIL NOW

DAYTON SAFETY LADDER CO., O. H.
2337 GILBERT AVE., CINCINNATI 6, OHIO

GENTLEMEN:
WITHOUT OBLIGATION ON MY PART PLEASE SEND ME FOLLOWING CHECKED BULLETINS:

.....SAFETY LADDERS SHOES	.....SAFETY GASOLINE CANS	.....SALT TABLETS & DISPENSERS
.....SAFETY LADDERS	.....OILY WASTE CANS	.....SAFETY GOGGLES
.....SAFETY CLOTHES	.....EXCELSIOR CANS	.....GLOVES
.....ROLL-ALONG LADDERS	.....WATCHMEN'S CLOCKS	.....FIRE BUCKETS
.....FIRE HOSE	.....ACID PUMPS	.....ROCK UP RACKS
.....FIRE EXTINGUISHERS	.....RESPIRATORS AND PARTS	.....“PLY”
		.....EYE SHIELDS

(Name) .....

(Company) ..... (Address) .....

TECHNICAL FILE ON TOXIC GASES AND VAPORS

D 63. DERMATITIS HAZARD. When workers have their hands in strong formaldehyde solutions over a prolonged period, they develop a severe dermatitis. The top skin layers harden and crack, producing a type of ulceration. The fingernails become deformed and often are lost. Removal of the worker from the exposure becomes essential; petrolatum or a boric acid ointment usually suffices to heal the skin disorders. It is thought that formaldehyde forms an irreversible combination with the protein of tissue cells on the surfaces that it contacts. During such contacts it may decompose to form methyl alcohol and formic acid, both known as toxic when absorbed. However, no after effects have been recorded, once the worker has recovered from the attack. A doctor's care is important in guarding against secondary infection pending recovery.

D 64. CONCENTRATION LIMIT. Several states have suggested 20 p.p.m. as a safe concentration limit for this gas. Controls and prevention follow those cited for ammonia.

D 65. HYDROFLUORIC ACID. Hydrofluoric acid, also called hydrogen fluoride and fluorhydric acid, is the most common gaseous member of the fluorine compounds that are not only local irritants, but protoplasmic cell-poisons as well.

The acid is a colorless, corrosive, fuming liquid whose vapors are somewhat lighter than air, the relative density being 0.71. The gas is soluble in water. Fluorine itself in an elementary state is a rare gas and has small significance in industry. It is more active and more corrosive than the acid, but in the presence of moisture it is converted quickly into the acid and ozone. The commercial form of the acid is in water solution.

D 66. INDUSTRIAL APPLICATIONS. Hydrofluoric acid enjoys wide usage because of its ability to dissolve silica. It is used to etch, frost, polish and finish all kinds of glass products, to remove sand particles in metal castings, to purify graphite, to clean copper and brass, to extract silica, aluminum, beryllium and gold from ores, to increase porosity in ceramics, to retard harmful fermentation antiseptically in breweries and distilleries, and in the manufacture of yeast, filter paper and various chemicals, such as hydrogen peroxide.

D 67. HYDROFLUORIC ACID POISONING. The action of hydrofluoric acid as an irritant of the membranes of the eyes and air passages is the principal effect of undue exposure to the hazard. The caustic action of this gas may damage permanently the eyes of sufficiently exposed workers. In addition, deep ulcers may develop from the inflammation of the membranes of the breathing passages. Other results frequently reported are bronchial catarrh, pneumonia, disturbances of the digestive system, mottled teeth, tear and saliva disorders, lowered resistance to infections, such as colds. Skin contacts with the acid cause a severe dermatitis, difficult to heal because of its blistering and ulcerating nature. The entire action of this acid on tissues is inclined to be more severe and painful than that of other acids, because it also acts as a true poison.

D 68. SAFE CONCENTRATION. The U. S. Public Health Service has suggested 3 parts per million as a safe concentration limit for a work shift exposure. Concentrations over that limit have been found harmful in a singularly chronic manner, the chronic poisoning affecting the skin, blood, teeth and bones.

D 69. SYMPTOMS OF POISONING. Signs are loss of appetite, as well as weight, anemia, areas of eczema, and tetany or bone affections due to a calcium deficiency in the tissues. Fluorine in the body has a way of robbing the calcium of the tissue cells to form calcium fluoride, which subsequently is deposited in the bones. Both breathing and motion become painful. In mild poisoning, the enamel of the teeth may become chalky white; in more severe cases, the teeth soften and acquire a dark color. Vomiting and shortness of breath are also common symptoms and, when the dose of the poison is especially great, the effects are convulsions, coma and death.

D 70. CONTROL AND PREVENTION. Because the action of this poison is less commonly known than that of other acids, education to its dangers becomes correspondingly more important. Controls of processes by enclosures or exhaust systems should be accompanied by informative warning posters. The company doctor should examine all workers in possible exposures regularly. Air samples should be taken and analyzed frequently by a competent laboratory. The pro-

TECHNICAL FILE ON TOXIC GASES AND VAPORS

tections for the workers outlined under the ammonia hazard should be adhered to carefully and affected workers immediately removed from the exposure. Water washes of the overhead, automatic treadle type should be within easy reach of the work room.

D 71. TREATMENT. If medical attention is not within quick call of the plant, first aid equipment can include subsequent washes of hot saturated solutions of sodium bicarbonate for quick application to burned areas, as well as an ointment of 1 part magnesium oxide and 2 parts glycerine. All other effects of the acid should be treated according to symptom by a physician familiar with this industrial poison. It should be remembered that, although hydrofluoric acid may not be as spectacular in overcoming workers as some of the other irritant gases, its danger is just as great, in an insidious way, if not greater.

D 72. SULPHUR DIOXIDE. Sulphur dioxide, also called sulphurous acid anhydride, is a colorless gas with a highly suffocating odor. It is formed in any process where sulphur-containing substances are burned or oxidized. It is readily soluble in water and alcohol and its water solution is commonly known as sulphurous acid. The latter can be oxidized easily to form the deadly sulphuric acid, cited previously. The gas, sulphur dioxide, is heavier than air, having a relative density of 2.2.

D 73. INDUSTRIAL USES. Sulphur dioxide may be present in processes, as the roasting and refining of sulphide ores, the burning of sulphur, zinc charging, in and around blast furnaces and brass foundries, in refrigeration, bleaching and the making of sulphuric acid, carbonic acid, alkali salts, bricks and brooms.

In a water solution as sulphurous acid it is used in disinfecting, tanning and softening of hides, in bleaching of fats, oils, silk, wool, straw and wicker-work, furs, feathers and sponges. It is also used in the refining of crude oils and paraffins, the making of dye intermediates, alums, salt cake, flour, food products and sulphite compounds and liquors.

D 74. EFFECTS OF SULPHUR DIOXIDE EXPOSURE. Sulphur dioxide is considered an irritant to the upper respiratory tract, whose effects spread to deeper tissues, causing inflammation of all tissues with which it comes in contact. The irritation of the membranes is due to the formation of sulphurous acid on the wet surfaces, which in turn is oxidized into the corrosive, burning sulphuric acid.

Sulphur dioxide causes few deaths, mainly because in high concentrations it is so irritating to the eyes and so choking when inhaled that exposed workers seek fresh air before they become affected dangerously. The gas can be detected by smell even in the open air around cities with blast furnaces, such as Pittsburgh and Cleveland, particularly when there is fog. However, there are no evidences that small concentrations of the gas breathed in over a long period can produce any disability other than catarrh or coarsening of the smell and taste senses. Apathy and fatigue have also been noted.

D 75. ACUTE POISONING. It is the acute form of the poisoning that is the usual experience of exposed workers, as when sudden, overwhelming doses of the gas escape into the air, for example, from a defective refrigerating apparatus or a broken container. If withdrawal should be impossible, the worker's lungs are affected quickly and his respiratory center paralyzed. Barring rescue, death results quickly, as from any asphyxiating agent.

D 76. TREATMENT. If breathing has ceased upon removal of the victim to fresh air, artificial respiration should be administered, as outlined for the ammonia hazard. The administration of oxygen from rescue equipment is important in any case. The summoning of the doctor should be immediate so that other symptoms, such as burns to the eyes, nose, throat and other affected tissues can be treated as required.

Usually there is no permanent disability upon recovery (although asthma has been reported) as damage is superficial except perhaps in the case of eye troubles. If any symptoms remain that indicate stomach or nerve disorders, it is customary to suspect the presence of toxic impurities such as arsenic or selenium.

D 77. CONTROL AND PREVENTION. Control and prevention of the sulphur dioxide hazard again is essentially one of enclosure of process or utilization of exhaust systems, with periodic inspection and air-testing for defects. Several states have adopted 10 parts per million as a safe concentration limit for the gas during a work shift exposure. As cited in other health hazards, education of the workers to the potential danger and an efficient first aid set-up are of paramount importance.

(To be continued)

INDUSTRIAL *Accidents in the News . . .*

These accidents are taken from the pages of the Nations Newspapers. They've all happened—they didn't have to!

Indianapolis, Ind., Star

Vora Keen, 24 years old, was in fair condition last night in Methodist Hospital with possible leg fractures. Police said a 1,500-pound machine part fell on him as he helped unload it from a truck at the Indianapolis Machine and Supply Company.

Prevention:

We assume from the above account that pure man-power was being used to unload this heavy piece of equipment. Mechanical power should have been used to aid in the unloading of this 1,500-pound machine part. Too often modern material moving methods are ignored and men injured in attempting to move objects far beyond their lifting strength. Even if industrial lift trucks are not immediately available for an unloading job such as described in the above news item, the simple procedure of using a sling in conjunction with a hoist or crane to move the equipment to an industrial flat truck would have saved this man from injury.

◆

Hoboken, N. J., Jersey Observer:

Stanley Kolacki, 39, of Brooklyn, a welder at the Bethlehem Company Shipyard in Hoboken, was hit on the head last night by an eight-inch steel wedge and received a scalp laceration. Kolacki had been working on the bottom of the S.S. Dauphin and was stepping out in the ramp between the ship and the dry dock when he was struck. Police learned that two iron workers, Irwin Haefert and Joseph Damaro, were using the wedge to adjust a shell plate on the side of the ship. It was accidentally dropped just as Kolacki walked under them.

Prevention:

When workmen are working overhead in an area impossible to rope off because of work going on below, a safety net should be rigged immediately under the scaffolding or place from which the above-ground men are stationed. In this news item and two others received on the same accident no mention was made that the injured man was wearing a safety helmet. Combination helmets and welding shields are available on the market and are especially designed to prevent the kind of injury described above.

◆

Kansas City, Mo.,

As Willard Stultz, 40, Wellington, Mo., leaned into a freight elevator shaft in the Marshall Auto Stores warehouse at 119 Independence avenue, to call a man on the floor below, the elevator descended, grazing Stultz's head. He suffered severe lacerations of the scalp and was rushed to the General Hospital.

Prevention:

First thought here is that it is surprising the victim didn't get his head knocked completely off his shoulders! Not considering the foolishness of the worker in sticking his head into an elevator shaft, the act itself should have been impossible and would have been so if the opening had been supplied with an interlocking gate or door. In nearly all states this is mandatory. Regardless of state laws however, common safety sense dictates the necessity of supplying all elevator openings with such devices.

◆

Atlantic City, N. J. Union:

Vitto Sebellino, 46, who underwent surgery today for injuries suffered when he was blasted through a window, and William Lendowsky, 19, who was knocked unconscious by an explosion of gasoline fumes, were both reported as still in serious condition.

Police Chief Richard De Pamphilis, who investigated the explosion, said the two men were working on the floor of a building and were using rags to soak up excess gasoline. The rags were tossed into a box of sawdust and burst into flames as a result of spontaneous combustion. There was little ventilation in the fume-laden room and the flames set off the explosion.

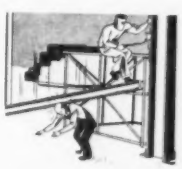
Prevention:

Special safety cans are available for the disposal of gasoline-soaked or oily rags. These cans should always be used as they have automatic closing lids and are otherwise constructed as to provide safe disposal of such rags. When working with gasoline or any other volatile liquid that gives off noxious, explosive or otherwise dangerous fumes, provision should always be made to provide ventilation—not only from an explosion standpoint—but from a health standpoint.

◆

Jersey City, N. J., Jersey Journal:

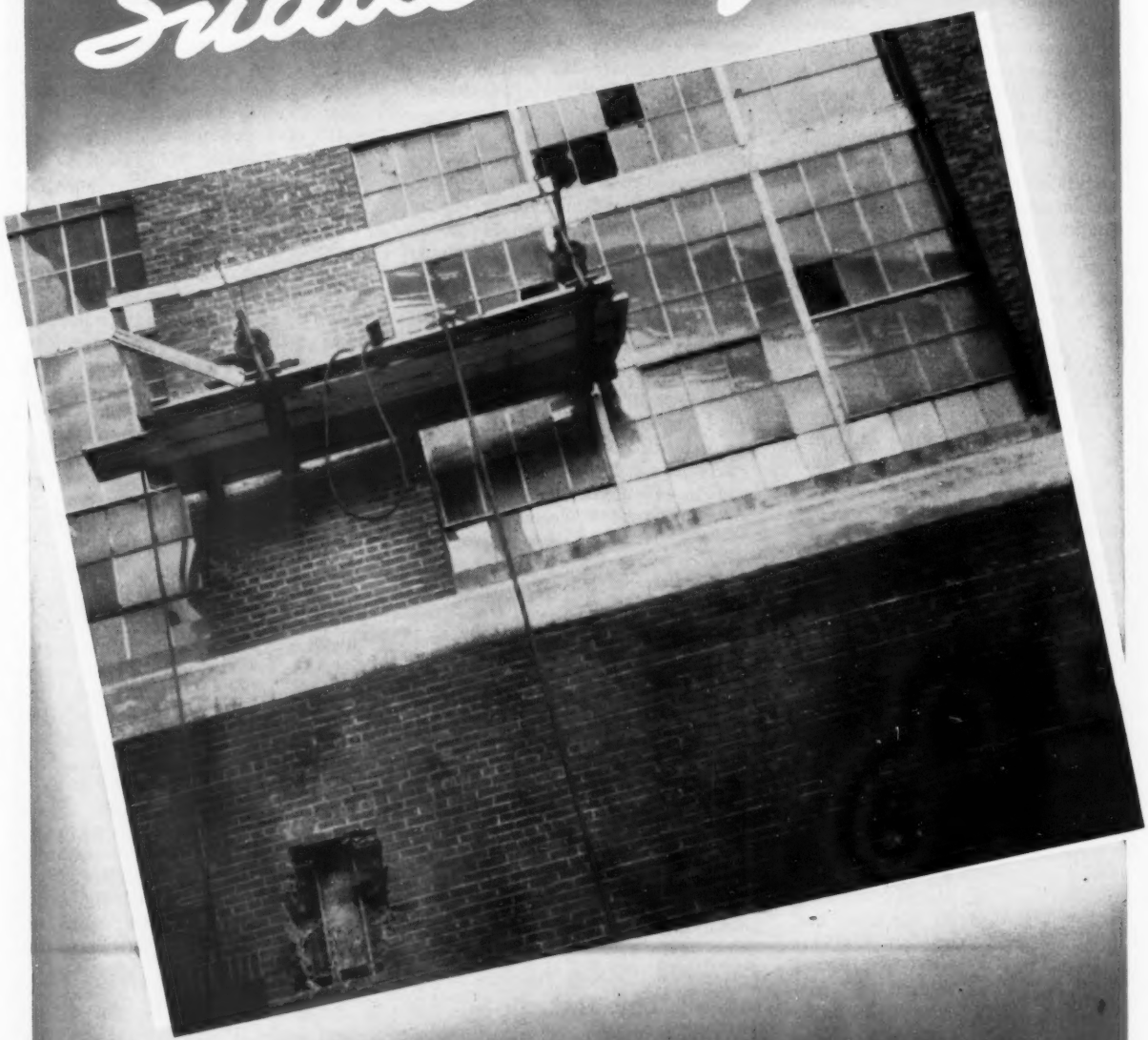
Walking beneath a 14-foot steel girder as it fell after a welder cut it with an acetylene torch, Angelo Forti, 60, was struck by the beam and killed while working at the Lackawanna Railroad shop, Lyndhurst, yesterday afternoon. The welder, Oliver Morgan, his eyes protected by semi-opaque welding goggles, could not see Forti walking by as he cut the girder.



Prevention:

From other news reports on this same story it is apparent that the girder was deliberately cut and intended to be removed. The area below the beam should have been roped off before the cutting operation so that it would have been impossible for anyone to walk under the operation. Provisions also should have been made to *lower* the 14-foot girder to the floor after it had been cut as the free fall of such a weight is a murderous invitation to trouble.

. . . And Sudden Injury



Because this piece of junk was used as a scaffold, a man fell some thirty feet to his death. While working on the wall with an air hammer, the "scaffold" pushed out and threw him off balance. Note the patched hand-rail, the cracked corner post brace, the large cracks in the flooring and the overall sloppy construction.

And Sudden Injury

The safety director of a large southern manufacturing plant sent us the picture reproduced on the opposite page. He wrote:

"Here is a picture of a scaffold from which a man fell resulting in instant death. The worker was using an air hammer to break through a brick wall. The supporting scaffold was a very flimsy sort of thing—as may be seen. Suddenly the scaffold pushed out from the wall causing the man to become over-balanced and he fell, landing head first on a concrete slab some 30 feet below.

An account of this accident is sent with the thought that possibly you would like to reproduce it under "And Sudden Injury," a page I read with interest each issue.

This accident occurred to a man employed by an outside contractor doing a construction job in our plant. Certainly, a piece of equipment of this type would not be tolerated here . . . "

Such a scaffold should not be tolerated anywhere! Scaffolds should be made of only the best materials and if of wood should be free of knots and cracks, should test to at least double the load it is to carry and should be well braced and provided with sturdy handrails and toeboards. Scaffolds should be subjected to regular inspections. Flooring should be constructed to avoid over-lapping at unsupported points and should be kept free of defects or slippery substances. Too often the flooring of a scaffold (see photo) consists of old, discarded planks not fit for fire wood. Flooring should be made of the best grade long leaf yellow pine, spruce, Douglas fir or Norway pine. Scaffolds that are carefully constructed and rigged will not push out from the wall. The use of safety belts and life lines, or similar safety equipment provides added insurance against falls of this sort.

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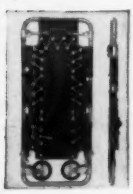

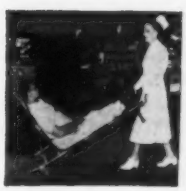

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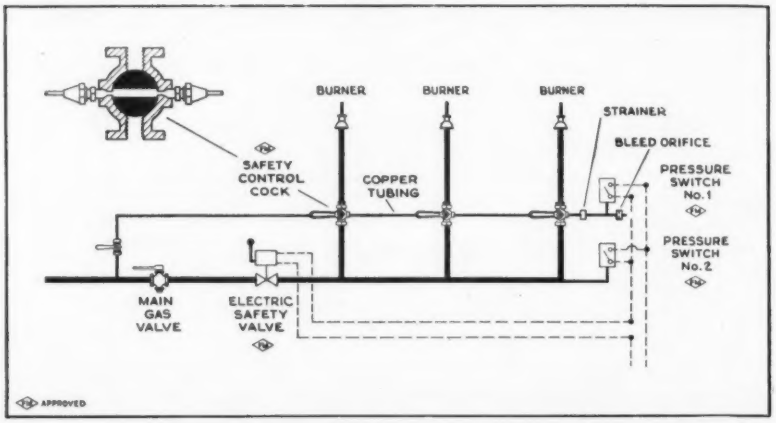
GAS SAFETY CONTROL COCK

From Page 24

The system is adaptable to any type of burner and its air-gas mixing equipment. Combustion air, where available, is preferable to gas for use in the safety system. Protection is provided against failure of combustion air or gas pressure, while firing. Other advantages, such as simplicity and reliability, also recommend the system for use in important installations. *(Reprinted through courtesy of the Factory Mutual Record.)*



USEFUL LITERATURE

UL-26 . . . To give complete protection against the hazards of explosions caused by flame failure in industrial oil burner installations, Combustion Control Corp. have published a bulletin describing their system for supervising both the pilot gas flame and the main oil flame of fully automatic oil burners. This equipment consists of a photoelectric scanner that is exceedingly compact in design and readily installed.

UL-27 . . . "This is more than a catalog—it is a practical work book on Unit Heaters" is the gist of a statement used by J. M. Frank, President of Ilg Electric Ventilating Co. in announcing the new Ilg Unit Heater catalog No. 348. This complete piece of literature includes designing of unit heating systems, gives certified ratings, shows photographs of application views, gives complete descriptions in computing Btu method of estimating heat requirements with examples and necessary tables showing Btu required and heat transmission constants. The book ends with essential engineering data including steam pipe size tables, piping diagrams, motor and control wiring diagrams and typical specifications.

UL-28 . . . W. S. Darley and Co. have announced that their 100 page catalog of fire equipment is now available. The pages of this catalog contain pictures and descriptive material of hundreds of items of interest to the safety engineer and the plant fire marshal. The two-page table of contents index includes everything from acid aprons to portable fire extinguishers, to fireproof blankets, to fog nozzles, to warning lights and to fire trucks.

UL-29 . . . Aluminum Ladder Co. has announced their new illustrated three-fold catalog devoted entirely to the line of aluminum fire ladders it has developed during the last 18 years. The catalog gives full specifications and prices for 62 pieces of equipment, falling into 8 general classifications ranging from single wall ladders to heavy-duty extension ladders. This equipment fills the requirements of large metropolitan fire departments and small plant fire brigades alike. Although designed for fire department use, two of the ladders—Type SL Single Wall Ladder and Type LDL Light Duty Extension Ladder—are widely used for industrial purposes.

UL-30 . . . American Allsafe Co. have published a clever folder entitled "Grandpa's Sunday Whiskers." It describes this company's AIRGARD punch press installations. The folder states that the secret of the positive protection by the AIRGARD is simple. When the punch press is equipped with an AIRGARD the operator no longer operates the press—he operates the AIRGARD — the AIRGARD operates the press.

UL-31 . . . A beautiful, multi-colored booklet has been published by Wolverine Shoe and Tanning Corp. and illustrates in natural colors their complete line of industrial leather gloves. Included in this impressive array are lightweight leather gloves for women and heavyweight leather gloves for industrial uses, including those with safety cuffs. Many styles of gloves and mits are illustrated in this complete work.

UL-32 . . . Pittsburgh Plate Glass Co. have published a detailed and comprehensive book of 35 pages entitled "Color Dynamics" which describes the scientific utilization of color to promote efficiency and safety in industry. The booklet includes the objectives of color dynamics, how it can be applied to machines, walls and floors. It further describes and illustrates in full color the safety color code for industry, including pipeline identification and many charts and graphs for various material specifications.

UL-33 . . . Sanitary Soap Co. has prepared a four page folder describing their "LANELLE", a non-poisonous, non - irritating powdered hand soap which is said to be highly germicidal and effective in removing all stubborn dirt and grime, grease, dye, ink and paint from the hands. It is described also as being mild and easy on the skin.

UL-34 . . . Plasti-Kote, Inc. have available a folder describing their SHUR - GRIP, a tough abrasive wear-resistant surfacing material easily applied by trowel or standard paint brush to any type of floor. This product is said to make decks, floors, stairs and ladder treds absolutely non-skid. It is shock-resisting and non-corrosive.

From Page 15

with a brake in addition to those specified in Section 105, which alone shall have sufficient torque to sustain at least the rated load." In addition to the ingot pouring cranes, there may be other special applications of hoist drives where to provide adequate safety, an additional brake is required. For example, a whirler crane with individual motor driven hoist, a mechanical applied brake in addition to the electrically operated brake and the electric brake may be required to allow for the safe lowering of the load in the case of electric power failure.

Paragraph 1058 of the Code covers brakes for bridge, trolley and slewing motions. Quotation from this code—

"(a) On cage operated cranes with the cage mounted on the bridge girders, a foot brake to properly retard and stop the motion of the bridge shall be installed.

(b) Brakes for retarding the motion of the bridge shall be capable of retarding at the rate of one foot per second while full load is being carried.

(c) The slewing mechanism should be provided with a brake or lock having equal holding power in either direction. The lever operating this brake or lock should have a device for locking in the holding positions."

Part (c) offers an advisory rule for a brake installation on the slewing mechanism. It is believed that it would be desirable to change this to a mandatory rule which would require the use of either a mechanical brake or an electrically operated brake. It would also be desirable that a standard recommended practice be established which would require that braking torques be limited to provide a retarding rate which would not cause excessive swinging of the load.

Brakes for Trolley Travel

It will be noted that the rules just quoted do not specifically cover brakes for trolley travel. It is suggested that an addition to the code be made to require the use of a

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mechanical or electrically operated brake on trolley motion and to establish a recommended practice which would limit the retarding torque to assure no wheel slippage or excessive load swing.

Trolleys on material handling bridges are today being operated at speeds up to and exceeding 1,000 feet per minute. Section 114, Paragraph 1141 states the requirement of trolley buffers and bumpers—

"(a) A bumper shall be provided at each end of the trolley travel. It should be fastened to the bridge girder or if the rail is prevented from sliding lengthwise, it may be fastened to the rail.

(b) A bumper engaging the tread of the wheel shall be of a height at least equal to the radius of the wheel. Bumpers engaging other parts of the crane are acceptable.

(c) If there is more than one trolley on the same bridge girders, buffers of cushioning devices shall be placed between the trolleys."

For high speed trolleys this code requirement alone is not adequate. It therefore is recommended that additional safety rules be included in the codes to assure safety. A limit switch or switches should be provided in each direction of travel near the end limit of travel which, when operated, would establish retarding torque to the trolley drive so as to assure a slow-down of travel speed to a value which would allow the trolley to hit the end buffer or bumper without causing damage to the equipment and operator.

If limit switch protection is not provided then it is recommended that buffers be required at each end of travel which will stop the trolley when traveling at full speed without causing damage to the equipment and operator. It would be, of course, desirable to provide both the limit switch protection and the buffers.

Power Disconnects

A subject often discussed by both builders and users is power disconnect means for cranes being located at the operator's station. Paragraph 1045-a of the American Standards Association Codes states, "On cage operated cranes an emergency switch shall be located within easy reach of the operator for disconnecting the power supply." The 1947 National Electric Code, Paragraph 6132, says "if cranes are operated from cages or cabs, a motor switch or circuit breaker shall be provided in the leads from the runway contact conductors. The switch or circuit breaker shall be in the cage or cab or mounted on the bridge and operable from the cage or cab when the trolley is at one end of the bridge."

The American Standard Association rule is interpreted by the Industry to allow either the use of a switch, breaker, or contactor. A revision to this code is suggested to include all these accepted disconnects. The question is often raised that if an electrically operated breaker or contactor is used, can it be mounted at some point away from the operator's station with only its control pushbutton at the station. There are many installations of this type which are giving dependable service. The modern trend is to a small full vision operator's cab. On cranes where the disconnect must have large current ratings, the installation of the dis-

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connect at the operator's station is not always feasible. It is the writer's opinion that a full vision operator's cab is desired to insure safe operation and pushbutton operation of remote power disconnects should be allowed.

The National Electric Code permits the installation of the disconnect on the bridge being operable only when the trolley is at one end of the bridge. The writer believes that a pushbutton operated electric disconnect with the pushbutton in the trolley cab would be a safer installation.

The American Standards Association code establishes an operating rule which states "a crane, derrick, or hoist shall not be loaded beyond the safe working load." In the design of electrically operated equipment, both the equipment builder and the electrical industry have made marked strides in their designs to limit the loading on the machine. By careful selection of the motor size and with the use of semi-magnetic or magnetic motor controllers, motor overload protection is obtained which provides partial safety protection against overloading the equipment. In some instances it has been found that the operator of the equipment or others have altered the controller's proper adjustment to allow for the lift of overloads or for increasing the machine operating time by providing faster acceleration. Such practice, of course, destroys the safety protection which was designed into the equipment. It is suggested that an addition to the code rules be made which would require that electrical controllers be installed in a locked compartment or enclosures and access to be allowed only for authorized maintenance.

Boom Type Crane

For the moveable boom type cranes, such as whirlers, the motor overload protection will not be adequate to assure protection, since the safe work load will vary with the boom position. Load strain gauge limit switches with boom angle compensators have been developed and used with some success to provide safe working load limits. It may be desired by the Industry to recommend a code requirement for this type of load limit protection. The interpretation of the code requirements for the grounding of cranes is a subject often discussed by builders and users. The American Standards Association code states in Section 104, Paragraph 1042 (b)—"All motor controller, and switch frames shall be grounded." Paragraph 1041 (a) of the same section also states in part, "wiring and equipment shall comply with the National Electrical Code . . ." Article 614, Section 6144, of this code states "motor frames, tracks, the entire frame of a crane or hoist, and cases of controllers shall be grounded in the manner specified in Article 250 . . ." A question often asked, "are grounding conductor straps between the motors, controllers, etc. and the structural frame required by the code?" It is the writer's opinion that Article 250, Section 2558, of this code clearly states that the use of such grounding conductor straps is not needed. This section of the code is quoted—"Equipment on Structural Metal. Electric equipment secured to and in contact with grounded structural metal frame of a building shall be deemed to be grounded. Metal car frames supported by metal hoisting cables attached to or running over sheaves

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or drums of elevator machines shall be deemed to be grounded if the machine is grounded in accordance with this code."

Another question often asked—"is a grounding collector shoe needed between the runway rail and the bridge or trolley, or do the bridge or trolley truck wheels provide an accepted continuous path to ground?" It has been the writer's opinion that the truck wheels provide an accepted grounding path.

Some time ago a request was made of our Corporation to comment on a new proposed two-wire direct current grounded installation for a material handling bridge where the bridge runway rail would be used for the grounded conductor. As such installations are not often considered and as there were very few safety code rules to serve as a guide, it is believed you may be interested in the following comments that were offered.

Article 250, Section 2593, of the National Electric Code for two-wire direct current circuits states in part "the carrying capacity of the grounding conductor for a direct current supply system shall be not less than that of the largest conductor supplied by the system . . ." A separate conductor insulated from the bridge structure for the grounding circuit was recommended along with collector shoes for the bridge runway rail grounding circuit pick-up, and a collector rail and shoe for the grounding circuit to the main trolley. The grounding circuit to both power and control circuits was to be solid without switches, breakers, or contractors. It is generally recognized, of course, that the grounding cricuit should never be broken. Thus the comment was offered to serve as a flag to controller builders that their conventional bridge controllers with breakers, switches, contactors, etc., in both sides of the line would not be suitable for this installation. It was recommended that all contactor coils, control coils, and relay coils of magnetic controllers be wired so that one side of the coils be connected direct to the grounding conductor and that all control interlocks, master switch contacts, etc., be wired between the other conductor and the coils.

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Standard Practices

During the past few years a number of groups have discussed the desirability of preparing and establishing standard recommended practices for electrical installations on cranes, hoists, whirlers, bridges, etc. Today the electrical insulation on material handling equipment is made to conform with adopted safety codes and the electrical practices of the equipment builders and the users. Their practices are formed by their past experience as well as by application data offered by the builders of electrical equipment. It would be the purpose of preparing such a standard to offer to the Industry in a concise form material relating to this type of equipment. Builders and users should be called upon to present their practices developed by their experience and to formulate recommended standard practices. Such a standard should clearly define the terms and conditions covering the design, construction, application, and installation of motors, generators, brakes, controllers, resistors, switches, breakers, lights, wire, conduit, etc. It is believed that with the establishing of such standard recommended practices, equipment will generally be of a better quality and of course improved quality results in the improved safety of the equipment.

Industries today are demanding

that materials handling equipment be built to move materials at a faster rate and with improved safety. In previous remarks the desirability of recommending code rule additions to provide crane travel limit switch protection along with controlled motor acceleration and deceleration to keep load swing to a minimum was pointed out. The angle of load swing to provide safe handling will vary with the type of load. Standard recommended practices should include a classification of loads with suggested maximum acceleration and deceleration rates to be used in the design of the equipment to assure safe operation.

Specifications for equipment often specify totally enclosed motors and upon investigating it is found that operating conditions in many cases would permit the use of open, drip-proof or splash-proof motor construction which would result in a reduced equipment cost. By establishing standard recommended practices which clearly define and classify motor types and which recommend suggested types for various applications, the user will be assured of obtaining quality equipment at economical cost.

The comments which have been made on individual items as suggestions for incorporating into standard recommended practices cover only a few of the many items that could be discussed to indicate the need for preparing and establishing standard recommended practices for cranes, hoists, whirlers, bridges, etc.

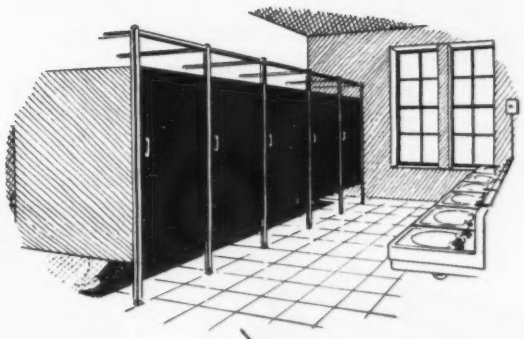
In conclusion it is necessary to always emphasize that all hazards cannot be guarded by mechanical or electrical means alone. For safe operation of equipment it is essential to have competent and careful operators thoroughly trained in the proper operation of the equipment.

** From a paper presented to the Materials Handling Machinery Manufacturers Conference held at the Westinghouse Electric Corporation, Buffalo, New York, November 8 and 9, 1948.*

CHEMICALLY BURNED EYES
From Page 16

referred to the ophthalmologist.

During the time the eye is under treatment the nurse should determine the offending chemical and the circumstances of the accident. This information is needed for the accident reports and also aids the specialist, giving him the clue to



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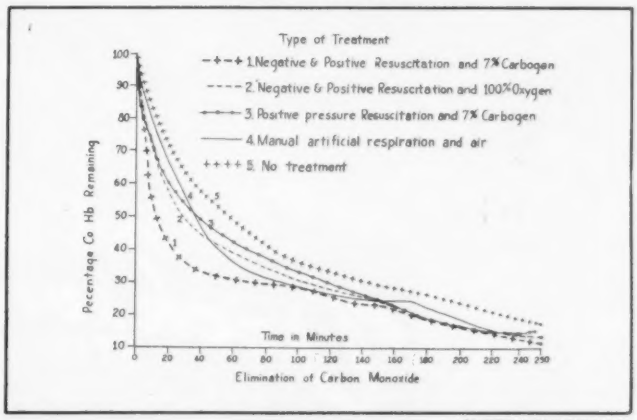
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what he will find when examining and treating this eye. There is a list published by the Manufacturing Chemists Association which gives the various chemical substances and the probable degree of injury expected. Reference to this chart will give the nurse some idea of the extent of damage to look for in the injury.

In the cases showing stain at the end of the thirty minute washing period, it is necessary to refer them at once to the ophthalmologist for the specialized treatment. The best results are seen in the cases which reach the specialist within four hours of the injury. Therefore no delay should be allowed in contacting the doctor and arranging for the patient to get to him. In many instances previous arrangements with the specialist and the company eliminates the necessity of calling him during office hours but at other times it will be necessary to contact him for instructions.

Specialized Care

The specialized care of the chemically burned eye as carried out by the physician in his office consists of again staining the eye with 2% fluorescin and examining it with the aid of the biomicroscope. This shows him the extent of damage done and makes it possible to remove only such cells as have actually been injured. The injured cells are removed with small cotton applicators after the eye has been anesthesized with 4% cocaine. The swab is moved in a circular motion over the entire surface of the cornea beginning at the center and completing with a careful cleaning of the cul-de-sacs. The eye is flushed with stainless merthiolate to remove all debris, and closed with sulfathiazole (5% ointment).

After Care

The *industrial nurse* again plays an important part in the after care of the *chemically burned eye*. These eyes are extremely painful and in the case of a single eye burn the patient is returned to the plant to be on the job. Therefore it will be necessary for the nurse to administer frequently pontocaine ointment to this eye during the course of the completion of the worker's shift. Tie-on patches are used, being easier to handle when doing frequent dressings. At the end of the patient's shift it is necessary to see that he is supplied with the pontocaine ointment for use at home and that he is given careful directions concerning

the replacing of the patch after treatment.

These patients should be seen the second day by the specialist to determine whether or not the eye healed. If not, treatment is continued. It is the responsibility of the *industrial nurse* to see that the patients make this return visit.

In those cases which do not heal by first intention it may be necessary for the nurse to carry out such treatment as may be ordered by the physician in the dispensary. Careful attention to these orders will aid materially in the healing of the burned eyes.

Experience over a period of several years had proven beyond any question of doubt that three distinct steps are necessary to treat satisfactorily a *chemical burn* of the human eye. They are: *immediate first aid, dispensary care,* and *treatment by the ophthalmologist.* The first two steps are of maximum importance and lie entirely in the field of *industrial nursing.* A recent survey of the chemical industry indicates a remarkable reduction in cost per case as a direct result of the faithful work of the *industrial nurse.*

SAFETY IN SAND BLASTING

From Page 19

may be directed at times toward an opening. Thus, if the blast nozzle be pointed at a target within two to three feet of a door crack, dust will escape through the crack, especially with favorable angles between blast target and crack.

Doors

Sandblasting room doors should be dust-tight in closed position. If the nature of the work involves frequent blasting toward the door, it can be effectively protected against warping by a loose hanging rubber curtain. Suitable gaskets with flanges can correct leakage, if the door is not sprung. The same requirement applies to rooms that include pivoting walls with integral table for feeding the work to and from the interior. Judgment as to the importance of leakage in specific circumstances may be aided by observation of frequency of dust leakage and its location with respect to workmen.

If other workmen are very near the room minor sources of leakage are of greater importance than otherwise. Leakage is most likely to be troublesome where operations require attendance of men on the outside, as in the case of rooms with pivoting walls.

Spillage

Where the room includes a recovery hopper below floor level, inspections to determine necessary maintenance should include regular observations of: (a) the pit, to discover significant leaks at welded corners of the hopper; (b) cleanout covers; (c) connection of hopper to screw or other horizontal conveyor; (d) connection of screw or other conveyor to the elevator housing; and (e) the bottom of the elevator housing itself. See Table 1 and Figure 1. Spillage of material in the pit which requires much labor time for clean up should be considered excessive and the cause found and corrected. This may be a significant source of dust, and, moreover, is often a reason for excessive sand blasting costs.

Elevator Exhaust

Where the elevator casing is not tight dust may leak from it and an

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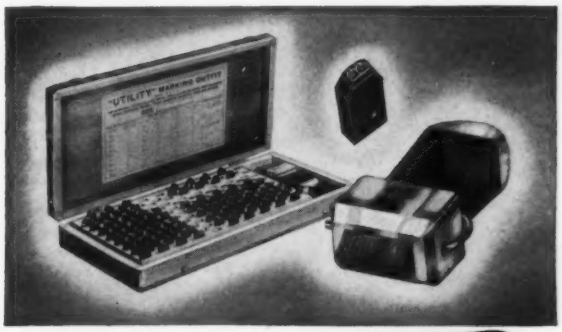

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TABLE 1 CHECK LIST FOR INSPECTION OF SANDBLASTING ROOMS
(See Figure 1)

Doors

(1) Do they close tightly? If not, does normal work involve frequent nozzle direction toward the door? (Look for dust leakage in these circumstances.)

Connection of Room Frame with Hopper or Floor

(2) Is joint tight or otherwise arranged to prevent dust leakage?

Hopper under Floor

(3) Is there an adequate seal at top and at bottom of hopper?

(4) Are clean-out doors dust-tight?

(5) Is there spillage of material through any cracks?

(6) If so, does its clean-up require more than a few minutes daily?

Elevator

(7) Is the housing in dust-tight condition?

(a) Section in the pit

(b) Above floor level

Abrasive Separator

(8) Any visible escape of dust from the housing? (There should be none if air for the "wash" is being exhausted at proper rate.)

(9) Is there visible dust as rejected debris falls to outside receptacle?

(10) Is there a "brisk" velocity inward through rejection openings?

(11) Is the exhaust duct free of settled material? (See "Exhaust Systems", page 14.)

Pressure Tank

(12) Does pressure release valve on abrasive pressure tank operate in a manner to prevent escape of dust to atmosphere?

exhaust connection usually near the top will be required. Elevator casings should have *dust-tight connections at feed and discharge ends.*

Escape of Abrasive

Small amounts of sand grain will sometimes escape by ricochet through air supply openings, even though intricately baffled. This does not indicate the escape of fine dust, and hence is without importance in the control of harmful dust.

Abrasive Separator

The abrasive separator, sometimes referred to as "abrasive air washer", serves the important function of removing fine dust and debris from the used sand. If the discharge spout for rejected debris terminates high above the floor, undesirable dust may be created in some instances by the drop of material to the floor. This is easily remedied by providing an extension to the chute which should discharge directly into a covered receptacle. Functional openings, such as those for rejection of large size refuse, should have inward air movement at velocities of 300 to 400 feet per minute.

Miscellaneous Dust Exposures

With proper helmet protection there is no dust exposure for the operator during blasting. Certain other relatively minor dust exposures, however, should be guarded against:

(1) Occasionally a careless workman may be observed to remove his helmet, then blow free dust from the castings. While the time of exposure is short it is an inexcusable practice and should

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be avoided at all costs.

(2) In a blasting room without collecting hopper, the sand must be shoveled into the elevator or blasting machine. If the helmet is removed during this operation undesirable dust exposure may result, especially if the room is not ventilated in accordance with the specifications elsewhere outlined.

(3) Clean-up men may be exposed to undesirable dust concentrations and this is one reason for emphasis on good maintenance to avoid accumulations of sand in pits, etc. Shoveling this material will cause dust. Even if the operation requires only a few minutes daily, the worker should be required to wear an approved dust respirator.

Inspection

Careful and periodic inspections should be made of all blasting room facilities and appurtenances. Table 1 and Figure 1 will be of assistance in arriving at inspection schedules.

Sandblasting Cabinets

Hand-Blast Cabinets

When using hand-blast cabinets the operator stands in front of the cabinet and directs the blasting nozzle through an opening. The opening may be rectangular and covered by a slit rubber curtain or comprise two armholes with integral rubber gauntlets or sleeves.

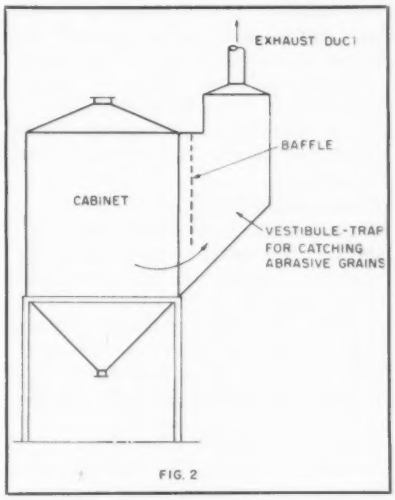

Figure 2

A trap adjacent to the sandblast cabinet, through which exhaust air passes, is especially advantageous with high rates of exhaust. It permits recapture of heavy grains of sand of useful size and protects duct work against excessive abrasion.

Sand is commonly returned for re-use by the ejector action of the compressed air used in blasting. In some cases a pressure tank is employed, located below the cabinet hopper in a pit or beside the cabinet with screen and elevator conveying equipment. Work may be handled manually through end doors, or a conveyor may feed and take away the work with slit curtains at entrance and exit.

Ventilation of Hand-Blast Cabinets

The rate of air exhaust should be not less than 400 to 600 cubic feet per minute nor less than sufficient to create an air velocity of 500 feet per minute through all openings. Where slit curtains are employed for nozzle or for work conveyor openings, two-thirds of the full open area should be used in calculating ventilation rate.

Cleaning of sand (i.e. removal of fines) is effected in the cabinet space as a result of ventilation. Exhaust rates greater than required merely for confinement of dust are, for this reason, considered good production practice. With the higher ventilation rates (e.g., up to 900 cfm for larger cabinets), it is particular-

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ly advisable to provide a trap arrangement, as illustrated in Figure 2, to avoid excessive loss of sand grain.

Leakage from Hand-Blast Cabinets

Possible points of leakage from hand-blast cabinets are at the door jambs and at the hose entrance into the cabinet. Occasional spurts of dust from these points indicate need for correction. If there is leakage at the door joint, the gasket should be renewed. Leakage at the hose entrance will not occur if the free space around the hose is properly sealed.

Sight Window and Sleeves, Hand-Blast Cabinets

The vision opening should be covered by a piece of plate or safety glass protected on the inside by screening. Ordinary window glass should not be used. Commercial cabinets provide for easy replacement of broken windows. The condition of gauntlets or sleeves as far as the wrist should be checked at intervals to insure that there are no rents through which dust might leak.

Pressure Tanks for Hand-Blast Cabinets

Used abrasive usually is re-fed to the sandblasting nozzle by suction from the cabinet hopper which serves for storage. Some installations employ a pressure tank into which the abrasive is fed at intervals and from which it is forced to the nozzle. Where pressure tanks are used, observation should be made of the operation of the relief valve to make sure there is no leakage of dust into the room when it opens. The relief valve should be so located as to vent into an exhausted enclosure.

Rotary Table Cabinets

Dust escape from rotary table cabinets is prevented by exhausting the blasting space, which is isolated from openings by a series of split, abrasion-resistant curtains. Three sets of curtains in series, at 4 inch intervals, at entrance and exit, is recommended by the American Foundrymen's Association and is in accordance with practice of best commercial units. The recommended exhaust rate in cubic feet per minute is equal to the curtained area in square feet multiplied by 200 feet per minute. These units should not be used on objects too long to permit the slit curtains to function properly e.g., objects longer than 8".

Self-Operating Blasting Units

Sandblasting barrels, tilted blast mills and similar units are unlikely to cause significant dust exposures because they do not require the attendance of any workman except for loading and unloading. The exposure is not for a long period unless there are a number of such mills operating at the same time requiring the continuous services of a man for loading and unloading. Like other blasting equipment, dust is prevented from escaping by exhaust ventilation of the enclosure, maintaining a negative pressure in the enclosure. Gaskets leakage should be checked at intervals. The rate of exhaust, as recommended by American Foundrymen's Association, is 20 times the volume of the barrel per minute. If noticeable quantities of dust escape during operation, the exhaust system should be checked as outlined in a later section. If difficult dust conditions are encountered with small mills they should be surrounded by a booth, exhausted to give a face velocity of about 100 feet per minute.

Auxiliary Equipment

Necessary adjuncts to blasting enclosures, to provide safety in abrasive blasting, are dust collectors, adequate exhaust systems and apparatus for measuring air flow to de-

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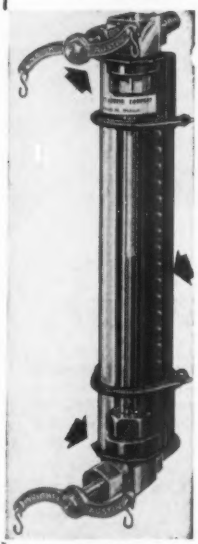

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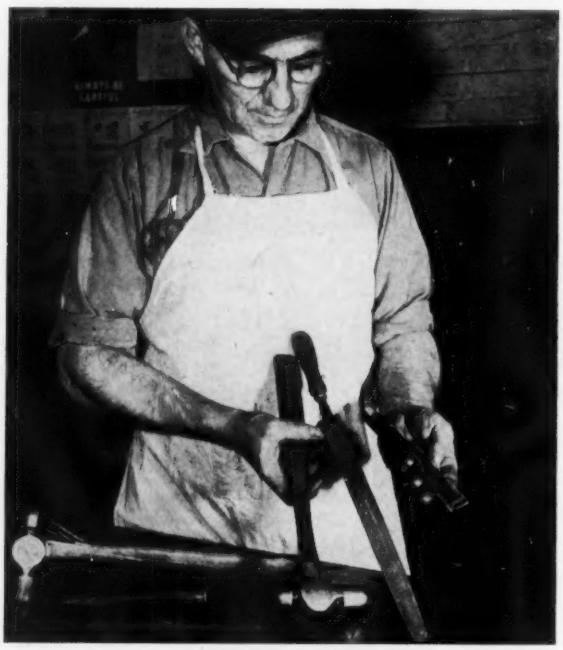

employees at Akron, Ohio are all safety-minded. Here a maintenance worker, Peter Hughes, demonstrates the thought he puts into the selection of the safest hand tools for his work around the plant. Discarded is the hammer with the split handle, the chisel with its splayed head and the file without a handle.

termine if adequate standards are being maintained. Also essential is individual respiratory equipment for protection of workmen at points where the dust concentration cannot be reduced to safe levels. These are discussed in what follows.

Dust Collector Air

Cloth dust filters and "wet" dust collectors are employed for use with blasting exhaust systems. Wet collectors have characteristic and constant pressure drops, information on which is available from the manufacturer. Cloth filters on the other hand, vary in pressure drop throughout the operating cycle and this introduces some problems which are discussed herein. Cloth collectors are effective when their size (cloth area) is appropriate to the installation and they are properly maintained and operated. Motor operated shaker mechanism should always be specified.

Size

The cloth collector for abrasive blasting should have an area of cloth in the ratio of one square foot for every two to four cubic feet air flow per minute. The dustier the cleaning job the lower the ratio should be.

Pressure Drop

The pressure drop across the cloth collector determines the fan duty in part—its speed and power demand. If the speed and motor are picked originally on an erroneous estimate of pressure drop that is lower than fact, the air flow rate through the system will be less than planned. If resulting velocities drop below that required for dust transportation, settlement of dust will occur in horizontal ducts, presenting an intolerable operating situation.

The pressure drop is at a minimum immediately after shaking and, most commonly, amounts to about 0.8 inches of water per cubic foot of air per minute per square foot of cloth. Thus for 3 cubic feet of air per minute per square foot of cloth the pressure drop would be 0.8 x 3 = 2.4 inches.

As dust accumulates on the cloth, air flow decreases (and pressure drop may increase) in proportion to the amount of dust collected. Insufficient data are available to predict these changes closely. With a ratio of 3 cubic feet per minute per square foot *at the end of a 4 to 5 hour operating cycle* (therefore, greater than 3 to 1 right after cloth shaking), the pressure drop may be as high as 4 to 5 inches, to which must be added friction loss in the duct to give the total resistance used in determining the fan requirement.

Location

The collector is usually best located outdoors. It is sometimes located indoors directly above the blasting room with discharge hoppers projecting into the blasting room. This permits unloading the collector into a dump car spotted within the room and avoids contamination of the adjoining space, provided the exhaust fan is re-started before dumping occurs. The discharge duct from the collector should run to the exterior of the building.

Part two of this article to appear in March issue.

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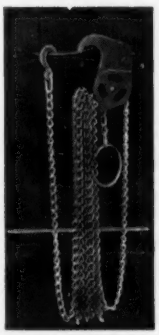

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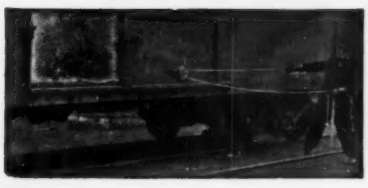

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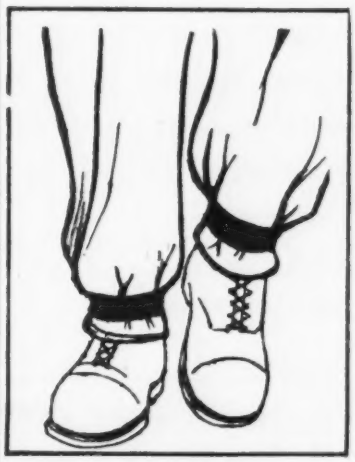

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